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DYNASCAN CORPORATION
2830
POWER SUPPLY
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SERVICE MANUAL

SERVICE MANUAL

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2830

DYNASCAN CORPORATION
4050 N. RAVENSWOOD
CHICAGO, ILLINOIS 60613

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MODEL 2830
SERVICE MANUAL

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	#7 2830 ANALYZING SCHEMATIC (ACA,1000mA)	496-174-9-007
	#8 2830 ANALYZING SCHEMATIC (DCA,10A)	496-174-9-008
13.	HISTORY OF PRODUCTION CHANGES	BACK COVER

FOR USEFUL INFORMATION REFER TO:

1.	2830 INSTRUCTION MANUAL	480-238-9-001
2.	2830 COMPOSITE (SCHEMATIC AND PARTS LIST)	499-144-9-001
3.	BP-30 INSTRUCTION FOLDER	481-095-9-001

1. POWER SUPPLY (FIG. 1)

The power supply generates three DC Voltages with respect to ground, +12V, -4V and V display. Note that there is a different symbol for a "low current ground" which is a separate conductor carrying very small current (10nA max.) to pin 1 of IC2. The transformer secondary voltages are rectified, filtered, then controlled by Q1. The +12V is regulated by IC1A which is ¼ of the quad op-amp 324. IC1A compares the reference voltage from high-stability zener diode D5 to a fraction of the 12V and keeps the two equal by adjusting V display. The 12V is the most tightly regulated of the supply voltages and results in a constant current (0.5mA) to reference diode D5.

Negative supply, -4V is more loosely controlled by zener diode D6 which operates near a relatively "soft" $I/_V$ curve knee. Thus the negative supply voltage shifts depending on the current through it, which is the current through devices connected to ground, such as D5, IC5, and IC7. When switched to ohms, IC5 becomes active so its supply current increases and -4V becomes about 0.4V more negative. The 12V supply is connected to IC7 only in the 10 ohms range, while supply to IC5 is removed for the purpose of saving battery current if the optional battery pack is used.

One end of D7 is connected to the circuit through jumper L2, so that for battery operation D7 is disconnected and wastes no power. In that case the voltage between +12V to V display is regulated by the battery rather than by D7. The 43Ω resistor R1 is also connected through jumper L1; for battery operation L1 is disconnected.

Note when the unit is "OFF" and still plugged in, the transformer is always "hot" and filter capacitors C1 and C3 are charged. This is for the purpose of battery charging.

2. ANALOG-to-DIGITAL CONVERTER (Fig 2)

The heart of the meter is the dual-slope integrator and control circuits in IC2, the 24-pin chip. Input voltages are ultimately passed through R30 to pin 3 which leads to a very high impedance (approximately 1000MΩ) buffer then to the auto-zero circuit and the integrator. The voltage on pin 3 is compared to that on pin 2, both taken with respect to pin 1, and the ratio times 2000 is the displayed result. For example, 0.25V on pin 3 while 2V are on pin 2 should read $\frac{.25}{2.0}$ x2000=250. For the auto-zero function to work properly, pin 1 must be at exactly the same voltage (within 50μV) as the low end of the sense path, which is at pin 6 of input divider RN-1 for voltages and at shunts R24, R41 for currents.

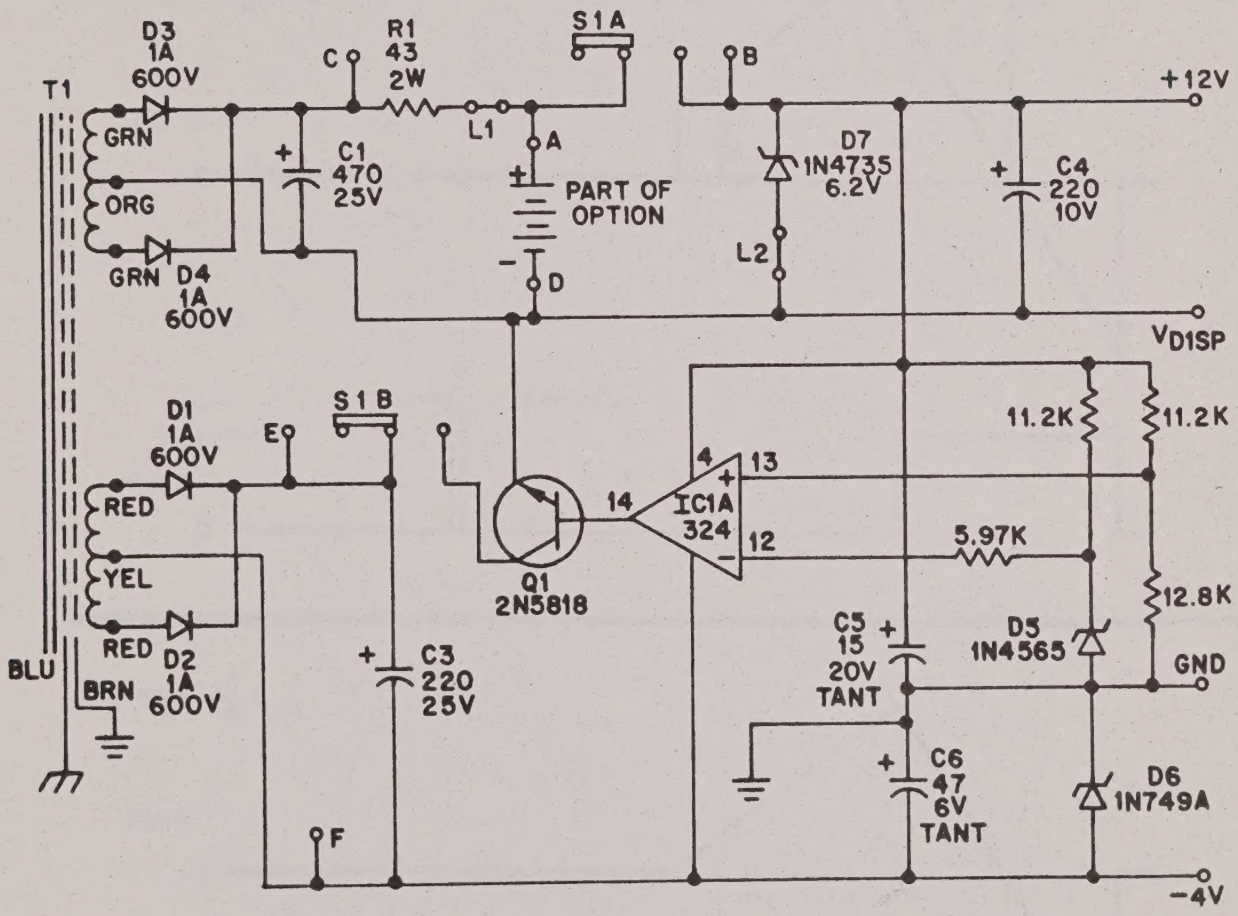


FIGURE 1 - POWER SUPPLY

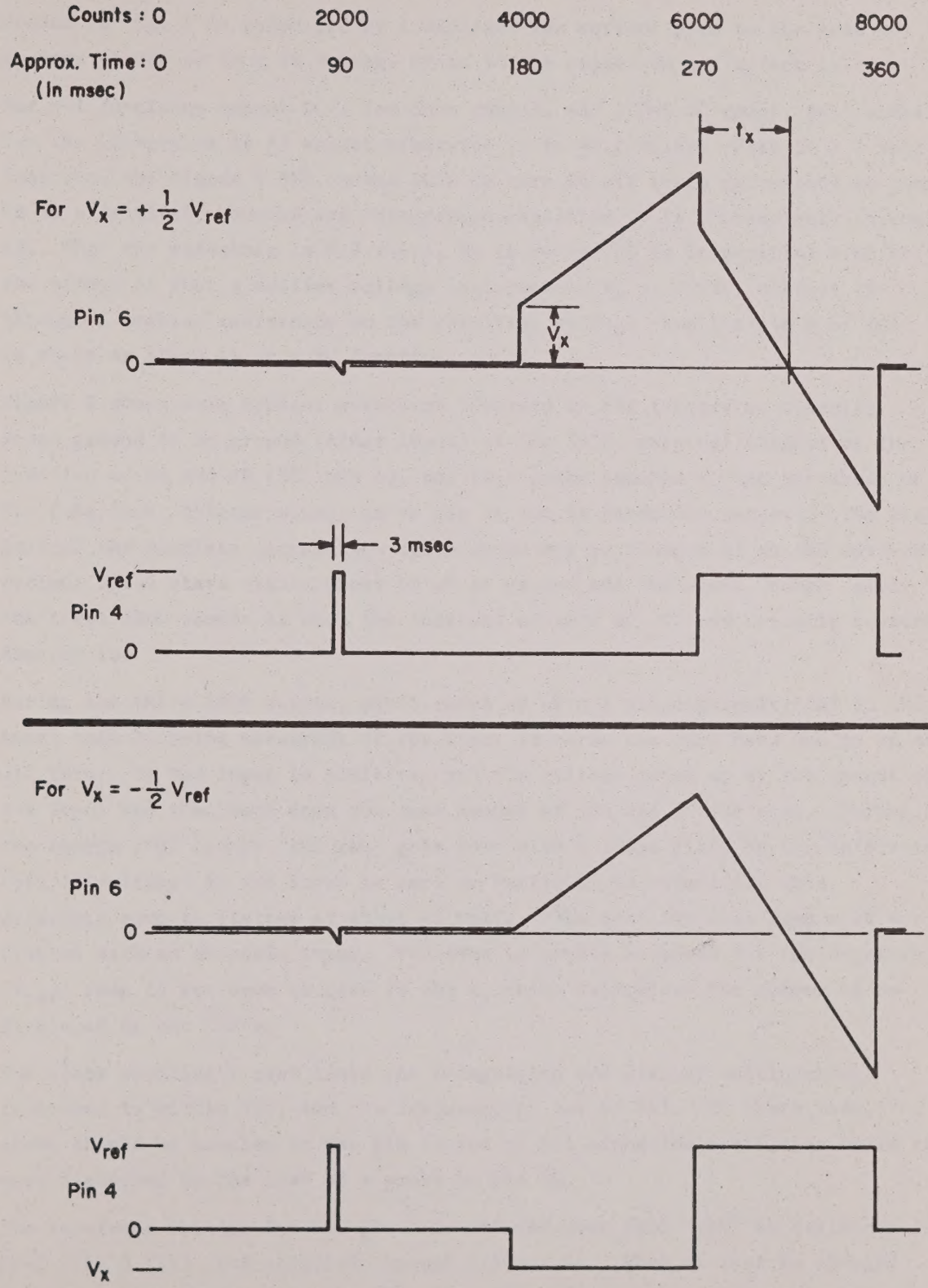


FIGURE 2 - TYPICAL WAVEFORMS IN INTEGRATOR CIRCUIT

Ground for pin 1 is connected by a separate low current path to the rest of grounds at R24 so that IR voltage drops in the copper do not affect it.

For all functions except DCA, low ohms ranges, and 100mV DC range, full scale for the integrator is ± 2 volts; otherwise it is ± 0.2 volts. When in a 2 volt function, the higher V REF causes IC1C to turn Q4 off (open circuited) so that R8 is effectively removed and integration capacitor C9 is charged only through R9. When the reference is 0.2 volts, Q4 is on and R8 is in parallel with R9; the effect is that a smaller voltage (alternately V_x or V REF) charges C9 through a smaller resistance so the resulting voltage ramp (at pin 6 of IC2) is about as steep as in a 2V function.

Figure 2 shows some typical waveforms observed in the integrator circuit; scope ground is on ground (minus input) of the 2830, external trigger on the junction of R8 and R9 (IC2 pin 4), and 10:1 probe touched to the pin shown on IC2 (the ideal trigger signal is on pin 14 but is harder to get at). The first half of the complete integration cycle shown may be thought of as the auto-zero period; pin 6 stays within about 60 mV of ground and the short "notch" after the first 2000 counts is when the internal offsets of IC2 are actually measured each cycle.

During the third 2000 counts, pin 6 ramps up with a slope proportional to the input (pin 3) being measured; if the input is zero, the ramp does not go up at all here. If the input is positive, pin 6's voltage jumps up by the amount of the input and then back down the same amount at the end of the ramp. During the fourth 2000 counts, the ramp goes down with a slope fixed by the reference (pin 2) voltage; if the input is zero or small, it is normal for this reference ramp to flatten at about -4 volts. The positive (V_X) ramp must not flatten with an on-scale input. The time in counts required for the negative (V_{ref}) ramp to get down to zero is the t_x which determines the number to be displayed by the LED's.

The clock oscillator that times the integrating and display multiplexing functions is within IC2, and its frequency is set by R11. To check that, the probe should be touched to the pin 11 end of R11 since the oscillator would be more disturbed by the load of a probe on pin 10.

The reference voltage for IC2 pin 2 is divided down from "+8V" by resistors in RN-2 (36k & 12k) and adjusted through trimpot R4. When it must be changed from 2 volts to 0.2V, switches S2B, S3A, S9C, S11A and/or S8B add a 1K resistor across 12K to ground.

3. DISPLAY

IC2 translates the number of counts corresponding to the t_x from its integrator stage into the time-multiplexed signals needed to drive BCD-to-7-segment decoder IC3 and digit drivers IC4. For example, for ½ (about 0.4 msec.) of the display cycle, the input of one driver (pin 8 of IC4D) is pulled high to make its output (pin 10) low which turns on the common-cathode display DS-4; at the same time IC2 puts the appropriate BCD code for that digit (the least significant digit) on its pins 20-23, with a high there meaning that bit is on. Note that "high" and "low" for the display circuits mean the +12V and $V_{Display}$ levels.

When the meter is given an overrange input, i.e. the voltage on pin 3 of IC2 is greater than that on pin2, pin 15 goes low which turns on the IclD oscillator circuit which in turn pulses the blanking input of IC3, so that all 4 displays are flashed on and off. D8 keeps that blanking input (pin 4 of IC3) from being pulled much below the "low" level.

Q3 switches current to the "minus" sign segment anode and switches S3B, S4A, S6B, and S7A provide current through Q9, Q10, and Q11 to the proper decimal point anode.

4. VOLTAGE ATTENUATOR and FREQUENCY COMPENSATION

Voltage inputs always see 10MΩ (±10%) as they are applied across the divider RN-1, through S14C and/or S13A. That resistor network is ratio-trimmed so that its smaller resistors are each decade fractions of its 9MΩ resistor. In the ACV function, DC-blocking capacitor C18 is put in series with the input. Compensation capacitor C20 is on the 100V range tap of the divider, and C21 is on the 10V range. If C20 or C21 were bad or missing, that would show up most on the 10V, 100V and 1000V ranges. On the other ranges, frequency response depends mainly on IC6 and its C16.

Overload protection is provided for the voltage ranges by metal-oxide varistors VR1, VR2, and VR3 connected across the input. At high energy transients, the varistor impedance changes from a very high standby value to a very low value, thus clamping the transients voltage to a safe value and protecting the instrument components. Long-sustained over voltage may destroy the varistors. They are designed to fail as short circuits. A 1/16 A, 250V, 3AG fuse (F2) is incorporated in the voltage input jack; this fuse normally opens before any damage to the instrument.

5. AC-to-DC CONVERTER (Fig 3)

When set to ACV, signals are routed from the selected tap of RN-1 to the level-shifting buffer Q8. That JFET passes on AC voltages just as they arrive at its gate except that its output (called "D" on the PCB legend) is centered at about 3 volts DC instead of zero. That DC shift is needed to let IC6 drive the rectification circuit without clipping pin 6's negative peak for large input amplitudes. When scoping this circuit, R37 (i.e. the Drain of Q8) is often a good place to look first. This low-impedance point is not affected much by the load of the probe; the gate of Q8 is a sensitive high-impedance point protected by R38 and D9.

D13 and D14 rectify the AC voltage signal, then pot R33 and two ratio-trimmed resistors in RN-3 (414 and 3766 ohms) form a voltage divider which feeds back a fraction of the level-shifted voltage (centered about the DC voltage which is fed to R30) from D14 through coupling capacitor C17 to the inverting input of IC6. Only the AC component is fed back by C17, while R36 closes the DC loop for IC6. When set to ACA, the voltage gain of the stage is changed from 1 to 10 by shorting out the 3766 ohm resistor so that less of the output is fed back to the op amp's pin 2 (so output must swing ten times as much to keep inputs equal). Because the DC result on D14's cathode has so much AC on it, it is filtered by R34 and C12 before going through the other R-C filter (R30 and C7) to IC2.

6. OHMS CONVERTER (Fig. 4)

For resistance measurements, a constant current is generated through the unknown (R_x) and the resultant voltage is applied to IC2 through R30. In Fig. (4) HI Ohms range selection is shown. In the low ohms ranges, the current generated is the same as in the next high ohms range but V_{ref} is switched to 0.2V so that only 0.1999 volts across R_x produces a full-scale reading.

The current is generated by dropping 1.0 volt through the selected part of RN-1. IC5 controls Q7, which acts like a variable resistor, to keep its two inputs equal; since its input current is very small and the gate junction of Q7 is reverse-biased, virtually all the current from RN-1 goes through D10 and R_x to ground.

Note that in the 10MΩ and 1000K LOΩ range only 100nA (1V across 10MΩ) is being passed through RN-1 and Q7 etc, so that a slight leakage (such as through a film or flux or a bad IC5 input) which did not show up on the lower ranges could badly affect these two ranges.

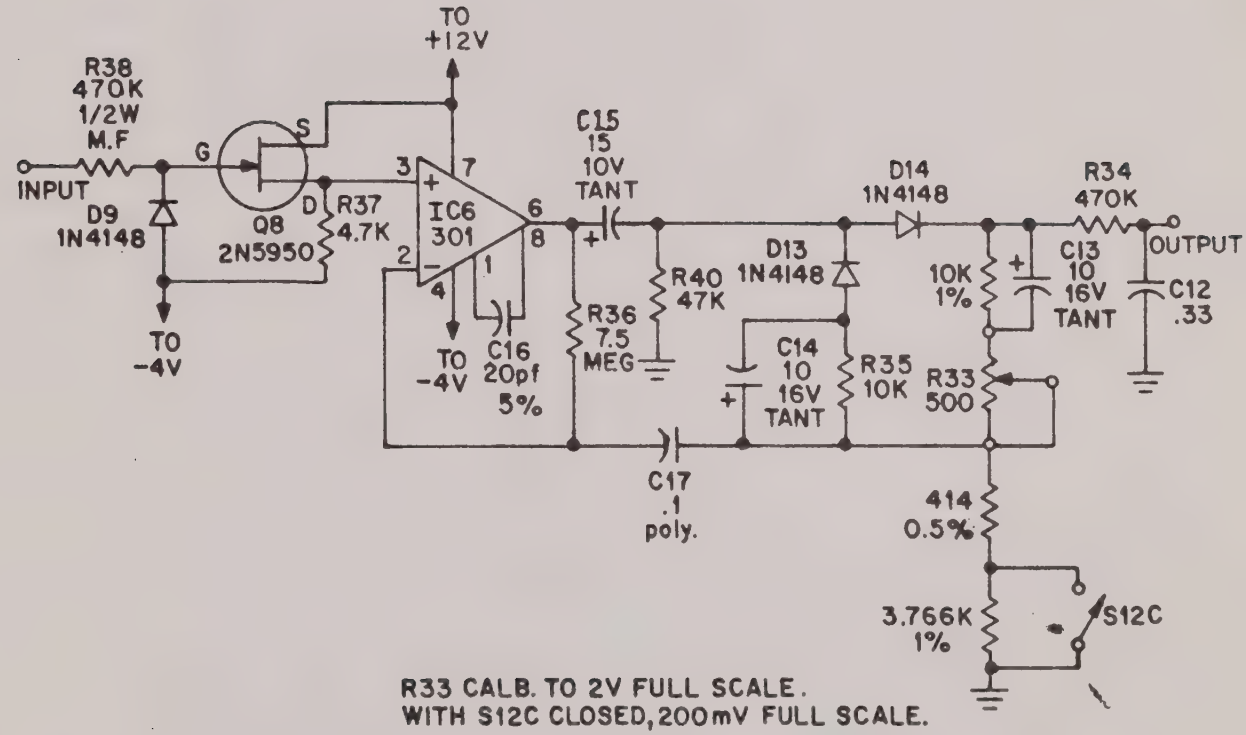


FIGURE 3 – AC TO DC CONVERTER

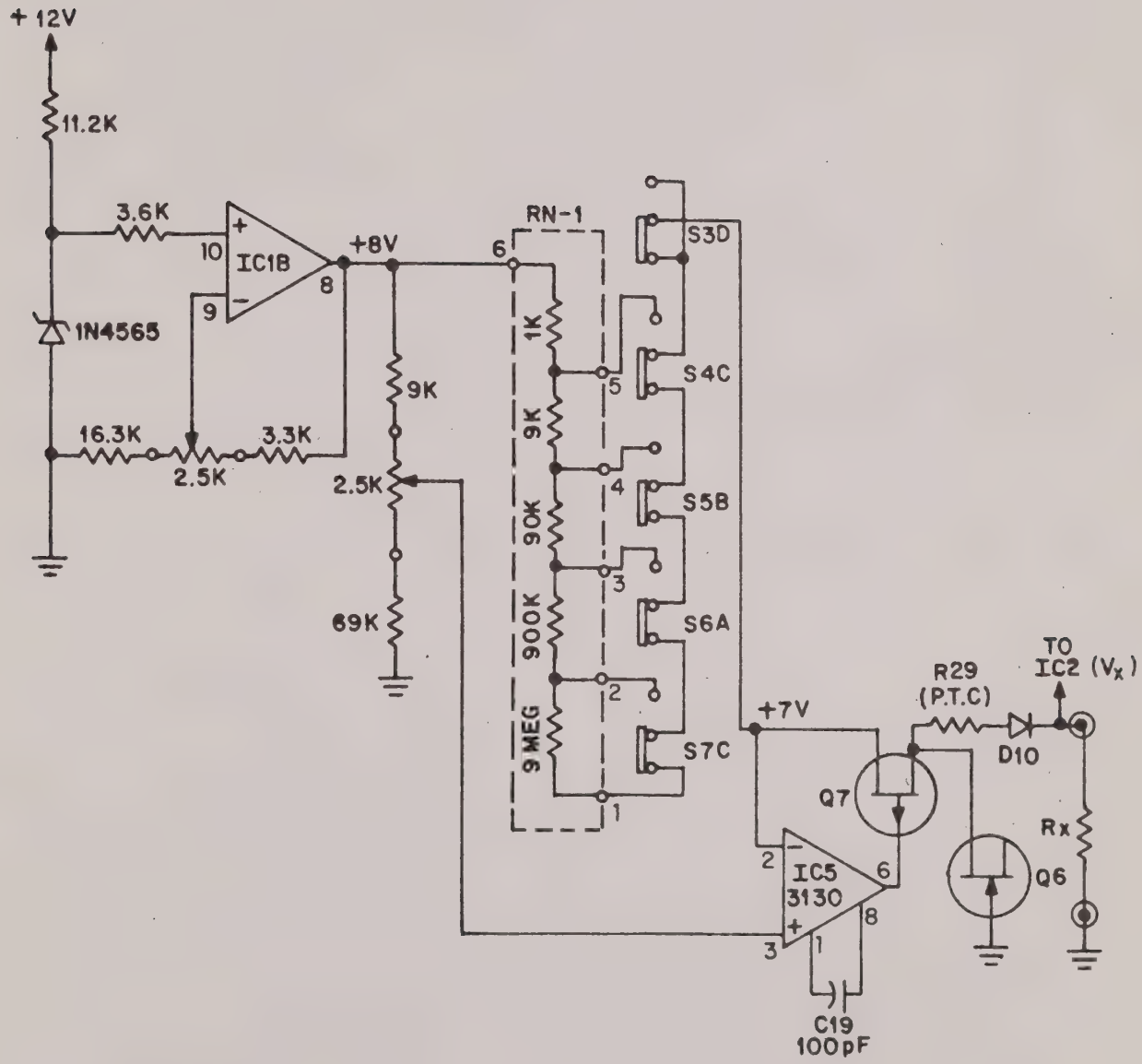


FIGURE 4 - OHMS CONVERTER

The ohms circuit protection depends basically on 1kV-rated D10, which blocks positive voltages accidentally applied to the meter input, and on R29. In normal use R29 has a resistance of about 2KΩ (±20%), but if a negative or AC voltage source is applied, then the current drawn through R29 heats it very fast and its resistance increases enormously (Positive Temperature Coefficient). A 2A, 250V, 3AG fuse (F1) is in series with the Ω & A input, protecting the ohms and current ranges.

7. 10 OHMS CONVERTER (FIG. 5)

The circuit shown (simplified) generates a constant 10mA through the resistor being measured by maintaining a voltage (adjusted by R44) of about 6.84V across the 684Ω resistor R42. If the resulting voltage at the meter's (+) terminal were sent to IC2, we'd see a measurement of R_x plus the resistance of the fuse, switch, test leads, etc. The same effect is present on all ohms ranges, but with so much current the problem is magnified. IC2is instead connected to the wiper of the 10Ω ZERO adjustment, R2, which is set to be below the (+) terminal voltage by the same amount as the voltage across the fuse and test leads etc. (about 3mV). The zero adjustment has no effect in other ranges or functions. For the 10 ohms range protection, a pair of clamping diodes (D15 and D16) is used across the input.

8. CURRENT MEASUREMENTS

In the AC and DC current functions, the input is switched through a 1K, 100, 10, 1, 0.1 or 0.01Ω shunt to ground and the voltage developed is sensed at the high end of R28 (for 10A range, sensed at R41). In DCA, that voltage goes directly to the A-to-D converter (IC2) in its 0.2V full scale mode. In ACA, the voltage goes first to Q8 and the AC circuit which now has a gain of 10 (instead of 1 as in ACV); its output goes to the A-to-D converter in its 2V full scale mode. If a pure DC current is passed through the meter when set to ACA, it should read zero due to the coupling capacitors (C15 and C17) in the AC circuit. Protection diodes D11 and D12 limit the voltage that may be developed across meter input.

In addition to the 2A, 3AG fuse in the current jack, a 1000V, 2A fuse is in series with the input which protects against high energy on the current ranges (except the 10A range).

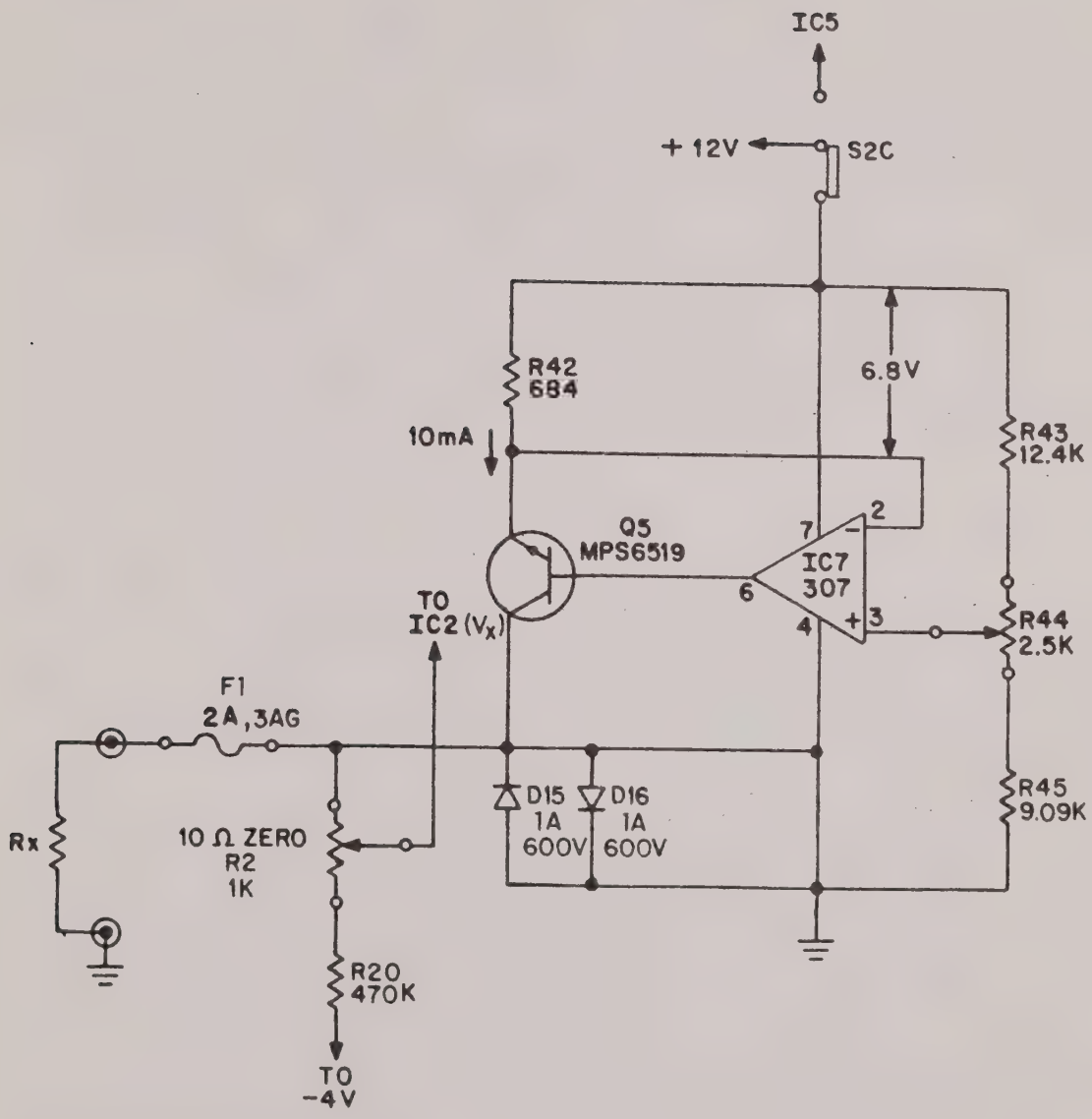


FIGURE 5 – 10 OHMS CONVERTER

9. CALIBRATION (FIG. 6)

The sources used in calibration should have an accuracy of 0.1% or better, and the AC signal must be a pure sine wave. The procedure below must be followed in order given, and is the same as the procedure in the customer manual.

a) Set unit to DCV 1V range.
b) Apply +1.9 volts to input and adjust R4 for a reading of 1.900.
c) Set unit to ACV.
d) Apply 1.9 volts RMS sine wave (any frequency between 50 and 400 Hz) and adjust R33 for a reading of 1.900.
e) Set unit to HI OHMS.
f) Connect 1.9KΩ ±0.1% to input and adjust R32 for a reading of 1.900.
g) Set unit to 10Ω range.
h) Short the input leads and adjust 10Ω zero control for a zero reading.
i) Remove short and connect 19Ω ±0.1% to input and adjust R44 for a reading of 19.00.

10. BATTERY PACK BP-30

The battery voltage is chopped into a square wave oscillation (10V peak-peak, centered at +7V, for a 5V battery) by the switching transformer and Q201 & Q202. The frequency is approximately 20KHz. If a much lower frequency is observed, or if the battery current is exceptionally high (with 0.00DCV displayed and a 5V battery voltage, 120 to 140mA is about normal, 200mA would be high), one of the two transistors may be bad (neither should be obviously warm; if one is, suspect that one). If both a scope and a power supply (in place of a battery) are to be used for checking this circuit, supply negative must be isolated from scope ground. The transformer secondary output is rectified and connected across filter capacitor C3 through the BP-30 connector.

Diodes D205, D206, and D207, when connected to decimal switching transistors Q9, Q10 and Q11, will turn on 3 decimal points simultaneously if batteries require recharging. At approximately 4.2V of battery voltage, the voltage at E (Q1 collector) drops to 10.2V. At this value, the three points P forward bias Q9, Q10, and Q11.

The batteries are charged through the diode D201 and the charging current is controlled by two lamps in parallel (I201 & I202). The charging current is approximately 90mA. While battery charging both lamps should be on. If one lamp fails, the charging current drops to half, resulting in twice the battery charging time.

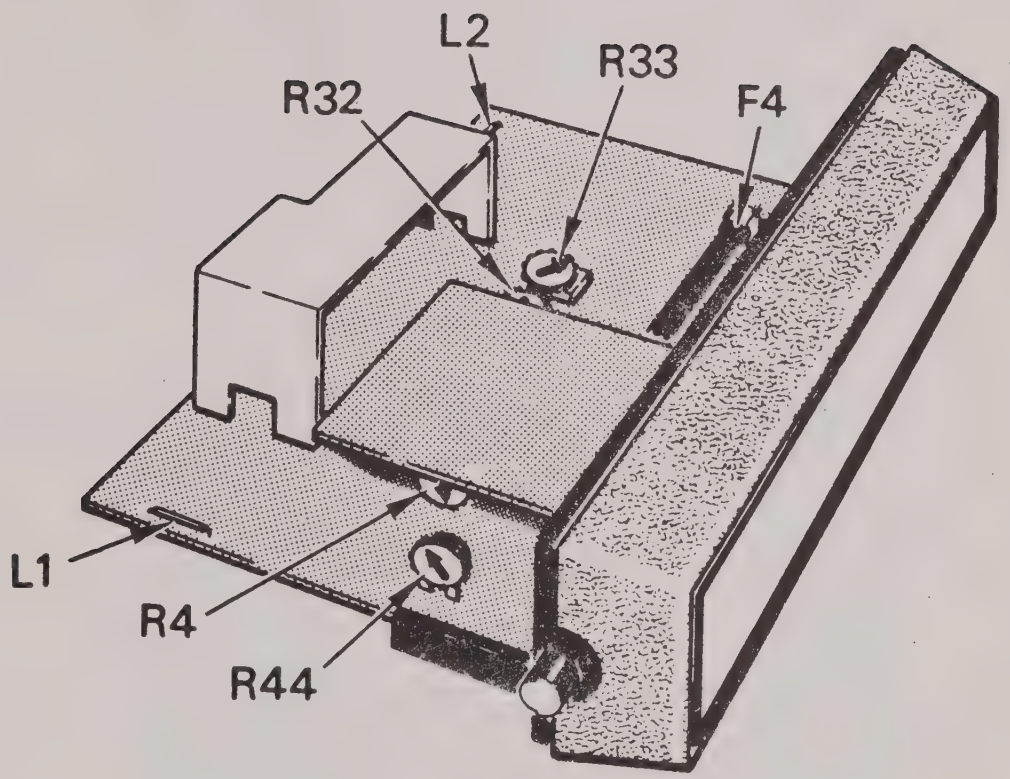
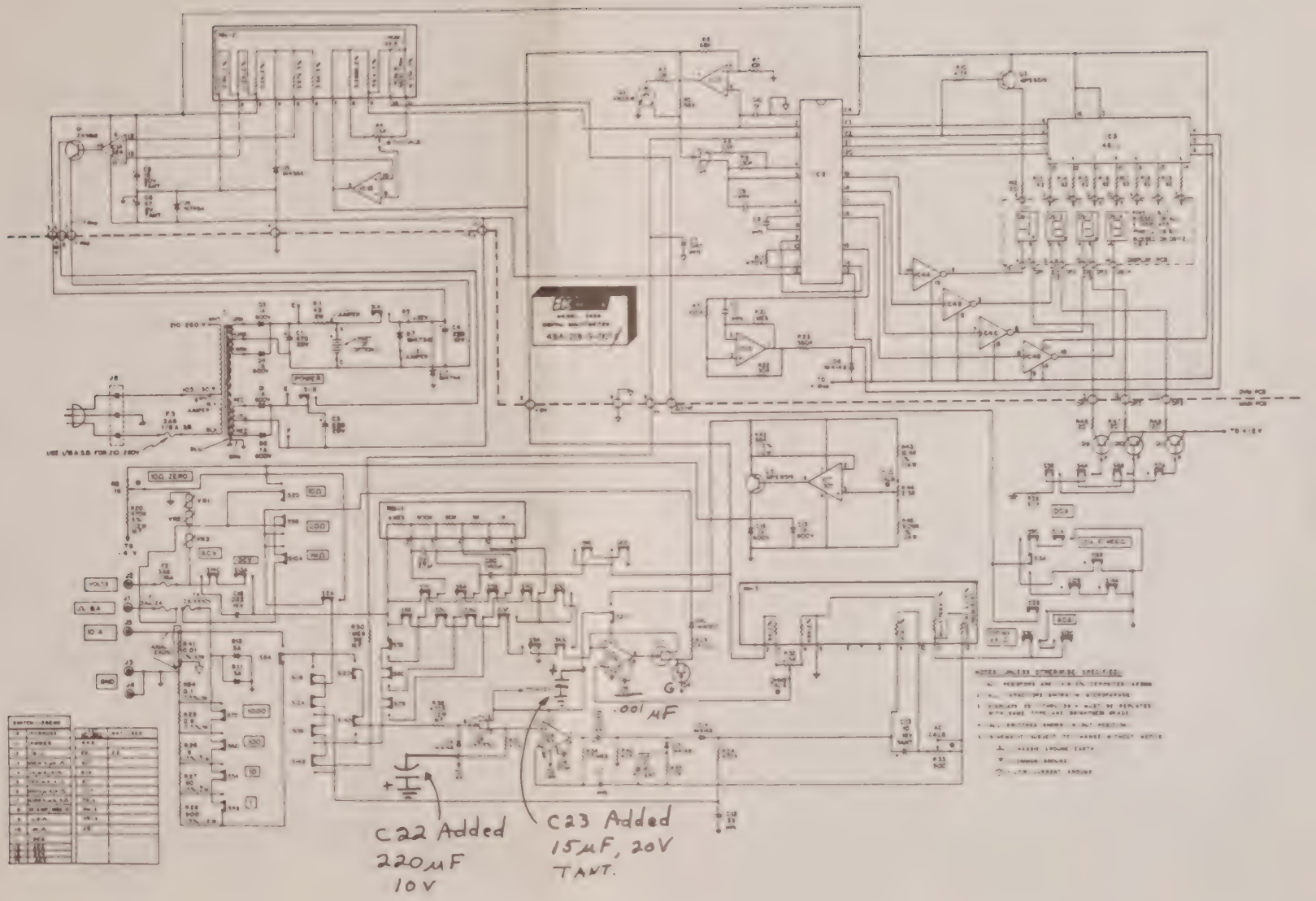


FIGURE 6 — LOCATION OF INTERNAL ADJUSTMENTS


C22 Added
220μF
10V
C23 Added
15μF, 20V
TANT.
.001μF

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	DIODES & TRANSISTORS (Continued)	
D17	1N4744A (15V) Zener	152-031-9-001
Q1, 2	2N5818 NPN Silicon Transistor	176-051-9-001
Q3, 5	MPS6519 PNP Silicon Transistor	177-015-9-001
Q4, 7	P Channel FET	182-035-9-001
Q6	FET (Clamp Diode)	182-036-9-001
Q8	2N5950 FET	182-031-9-001
Q9, 10, 11	PNP Silicon Transistor	177-017-9-001
	INTEGRATED CIRCUITS	
IC1	324, Quad Op Amp	307-060-9-001
IC2	CMOS LSI A/D Converter	307-085-9-001
IC3	4511	307-061-9-001
IC4	75491	307-082-9-001
IC5	CA-3130S	307-073-9-001
IC6	301	307-074-9-001
IC7	307	307-123-9-001
	MISCELLANEOUS	
T1	Transformer, Power	065-138-9-001
S1 thru 14	Switch Assembly (14 Station)	088-040-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Red Body)	238-009-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Black Body)	238-010-9-001
F1	Fuse, 3AG, 2A	191-251-3-002
F2	Fuse, 3AG, 1/16 A	191-005-9-001
F3	Fuse, 3AG, 1/8 A Slow-Blow (105-130V)	190-251-3-108
	Fuse, 3AG, 1/16 A Slow-Blow (210-260V)	190-002-9-001
F4	Fuse, 1000V, 2A	194-004-9-001
	Overlay, Front Panel	255-161-9-001
	Case, Rear (Plastic)	271-057-9-001
	Case Front (Plastic)	271-062-9-001
	Fuse Lock Housing (½), 2 Required Per Fuse	380-247-9-001
	Handle, Plastic	380-279-9-001
	Window, Display	380-295-9-001
	Pad, Anti-Skid (Rear Foot)	381-080-9-001
	Button, Switch (White)	384-019-9-009
	Button, Switch (Tan)	384-019-9-017
	Button, Switch (Bright Ochre)	384-019-9-020
	AC Power Cord	420-022-9-001
	15-Lead Jumper (Display Board Assembly)	427-025-9-001
	Test Lead, Black	522-062-9-001
	Test Lead, Red	522-063-9-001
	Fuse Holder /Jack Assembly	523-218-9-001
	Decorative Screw (Handle Pivot)	634-085-9-001
	Fuse Clip (3AG)	741-058-9-001
	Fuse Clip (1000V)	741-104-9-001
	Fuse Holder Contact Spring	767-038-9-001
	Spring, Handle Pivot	767-049-9-001
	AC Receptacle	770-018-9-001
	Jack Insert	771-027-9-001

NOTE: Standard value resistors are not listed. Values may be obtained from schematic diagram. Minimum charge $5.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover postage or express charges. Specify serial number when ordering replacement parts.

B & K-PRECISION MODEL 2830 DIGITAL MULTIMETER PARTS LIST

488-218-9-002D

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
R2	Potentiometer, 1KΩ, ¼W, 20%	008-333-9-001
R4, 44	Trimpot, 2.5KΩ (VERTICAL)	010-007-9-005
R20, 38	470KΩ, ½W, 5% P.F. Metal Film	011-102-8-474
R24	0.1Ω, 1W, ½% P.F. Wirewound	004-178-9-001
R25	0.9Ω, 1W, ½% P.F. Wirewound	004-160-9-001
R26	9Ω, ½W, ½% P.F. Metal Film	011-088-9-001
R27	90Ω, ½W, ½% P.F. Metal Film	011-089-9-001
R 28	900Ω, ½W, ½% P.F. Metal Film	011-141-9-001
R29	Limiter, Special Hi voltage current	004-163-9-001
R30	1 Meg Ω,3W, 5% Metal Film	011-003-5-105
R32	Trimpot, 2.5KΩ (HORIZONTAL)	010-008-9-005
R33	Trimpot, 500Ω (HORIZONTAL)	010-008-9-003
R41	.01Ω, 10W, 1% 4 Terminal Wirewound	004-177-9-001
R42	684Ω, ½W, ½% P.F. Metal Film	011-058-9-001
R43	12.4KΩ, ¼W, 1% P.F. Metal Film	015-141-1-242
R45	9.09KΩ, ¼W, 1% P.F. Metal Film	015-141-9-091
VR1, 2, 3,	Metal Oxide Varistor	004-179-9-001
	NETWORKS	
RN-1	Resistor Network (INPUT)	012-017-9-001
RN-2	Resistor Network	012-018-9-001
RN-3	Resistor Network	012-014-9-001
	CAPACITORS	
C1	470μF, 25V, Electrolytic	022-095-9-001
C3	220μF, 25V, Electrolytic	022-083-9-001
C4	220μF, 10V, Electrolytic	022-109-9-001
C5	15μF, 20V, 20% P.F. Tantalum	027-016-9-001
C6	47μF, 6.3V, 20% P.F. Tantalum	027-013-9-001
C7	.047μF, 100V, 20% P.F. Polyester	025-094-9-001
C8, 9, 11, 17	0.1μF, 100V, 20% P.F. Polyester	025-109-9-001
C10	.01μF, 100V, 10% P.F. Disc Ceramic	020-101-9-001
C12	0.33μF, 100V, 10% P.F. Polyester	025-114-9-001
C13, 14	10μF, 16V, 20% P.F. Tantalum	027-030-9-001
C15	15μF, 10V, 20% P.F. Tantalum	027-009-9-001
C16	20pF, 500V, 5% P.F. NPO Disc Ceramic	031-039-9-001
C18	.022μF, 1KV, 20% P.F. Polyester	025-103-9-001
C19	100pF, 500V, 10% P.F. Disc Ceramic	020-044-9-001
C20	360pF, 500V, 5% P.F. Disc Ceramic	020-199-9-001
C21	27pF, 500V, 5% P.F. NPO Disc Ceramic	031-046-9-001
	DIODES & TRANSISTORS	
D1, 2, 3, 4, 15, 16	Silicon Diode, 1A, 600V	151-050-9-001
D5	1N4565 (6.4V) Reference Zener	152-066-9-001
D6	1N749A (4.3V) Zener	152-062-9-001
D7	1N4735A (6.2V) Zener	152-037-9-001
D8, 9, 13, 14	1N4148 Silicon Diode	151-038-9-001
D10	Silicon Diode, 1A, 1KV	151-053-9-001
D11,12	Protection Diode (Silicon) 3A	151-054-9-001

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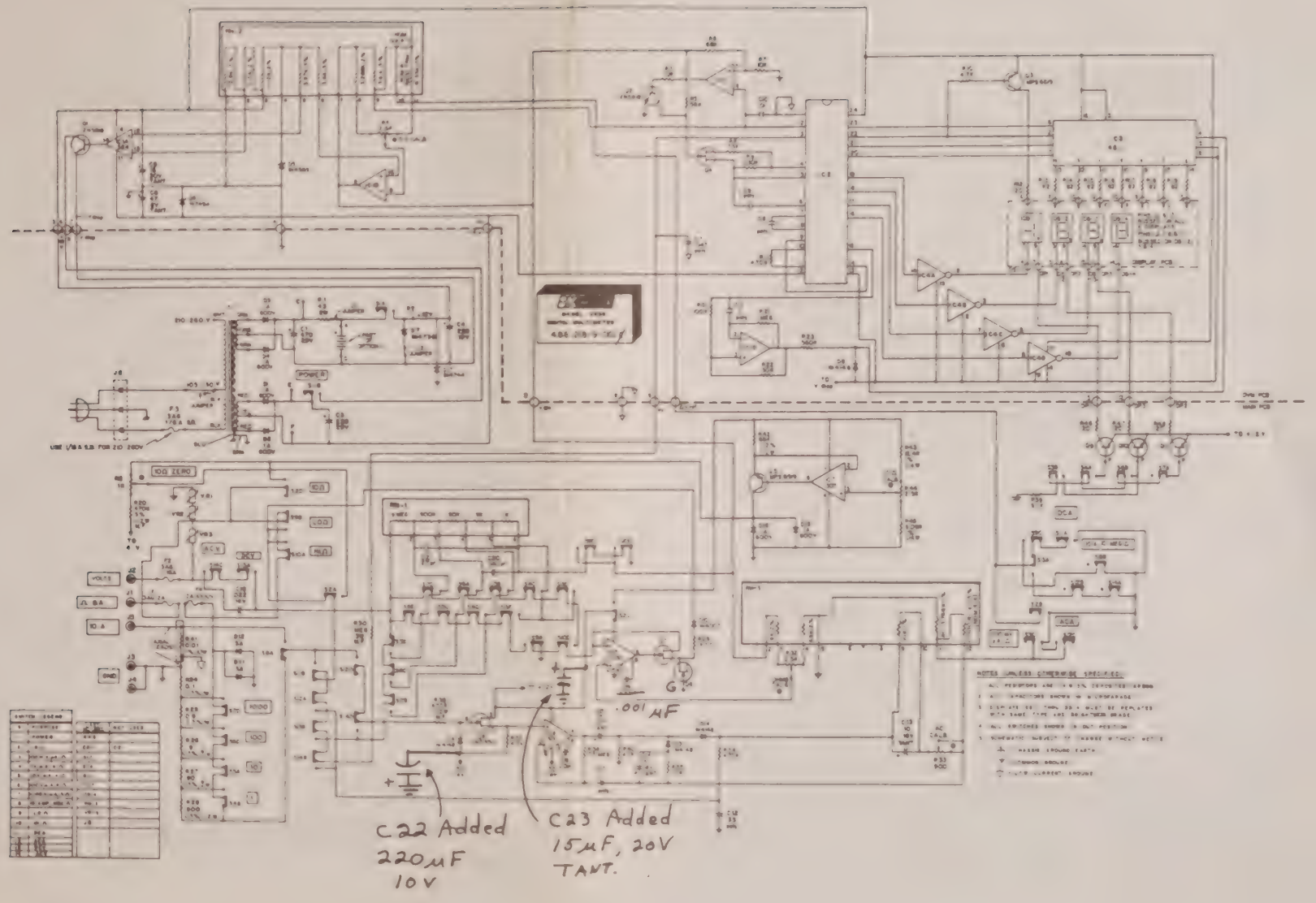
COMPOSITE
499-144-9-001 D


C22 Added
220μF
10V
C23 Added
15μF, 20V
TANT.
.001 MF

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	DIODES & TRANSISTORS (Continued)	
D17	1N4744A (15V) Zener	152-031-9-001
Q1, 2	2N5818 NPN Silicon Transistor	176-051-9-001
Q3, 5	MPS6519 PNP Silicon Transistor	177-015-9-001
Q4, 7	P Channel FET	182-035-9-001
Q6	FET (Clamp Diode)	182-036-9-001
Q8	2N5950 FET	182-031-9-001
Q9, 10, 11	PNP Silicon Transistor	177-017-9-001
	INTEGRATED CIRCUITS	
IC1	324, Quad Op Amp	307-060-9-001
IC2	CMOS LSI A/D Converter	307-085-9-001
IC3	4511	307-061-9-001
IC4	75491	307-082-9-001
IC5	CA-3130S	307-073-9-001
IC6	301	307-074-9-001
IC7	307	307-123-9-001
	MISCELLANEOUS	
T1	Transformer, Power	065-138-9-001
S1 thru 14	Switch Assembly (14 Station)	088-040-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Red Body)	238-009-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Black Body)	238-010-9-001
F1	Fuse, 3AG, 2A	191-251-3-002
F2	Fuse, 3AG, 1/16 A	191-005-9-001
F3	Fuse, 3AG, 1/8 A Slow-Blow (105-130V)	190-251-3-108
	Fuse, 3AG, 1/16 A Slow-Blow (210-260V)	190-002-9-001
F4	Fuse, 1000V, 2A	194-004-9-001
	Overlay, Front Panel	255-161-9-001
	Case, Rear (Plastic)	271-057-9-001
	Case Front (Plastic)	271-062-9-001
	Fuse Lock Housing (½), 2 Required Per Fuse	380-247-9-001
	Handle, Plastic	380-279-9-001
	Window, Display	380-295-9-001
	Pad, Anti-Skid (Rear Foot)	381-080-9-001
	Button, Switch (White)	384-019-9-009
	Button, Switch (Tan)	384-019-9-017
	Button, Switch (Bright Ochre)	384-019-9-020
	AC Power Cord	420-022-9-001
	15-Lead Jumper (Display Board Assembly)	427-025-9-001
	Test Lead, Black	522-062-9-001
	Test Lead, Red	522-063-9-001
	Fuse Holder /Jack Assembly	523-218-9-001
	Decorative Screw (Handle Pivot)	634-085-9-001
	Fuse Clip (3AG)	741-058-9-001
	Fuse Clip (1000V)	741-104-9-001
	Fuse Holder Contact Spring	767-038-9-001
	Spring, Handle Pivot	767-049-9-001
	AC Receptacle	770-018-9-001
	Jack Insert	771-027-9-001

NOTE: Standard value resistors are not listed. Values may be obtained from schematic diagram. Minimum charge $5.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover postage or express charges. Specify serial number when ordering replacement parts.

B & K-PRECISION MODEL 2830 DIGITAL MULTIMETER PARTS LIST

488-218-9-002D

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
R2	Potentiometer, 1KΩ, ¼W, 20%	008-333-9-001
R4, 44	Trimpot, 2.5KΩ (VERTICAL)	010-007-9-005
R20, 38	470KΩ, ½W, 5% P.F. Metal Film	011-102-8-474
R24	0.1Ω, 1W, ½% P.F. Wirewound	004-178-9-001
R25	0.9Ω, 1W, ½% P.F. Wirewound	004-160-9-001
R26	9Ω, ½W, ½% P.F. Metal Film	011-088-9-001
R27	90Ω, ½W, ½% P.F. Metal Film	011-089-9-001
R 28	900Ω, ½W, ½% P.F. Metal Film	011-141-9-001
R29	Limiter, Special Hi voltage current	004-163-9-001
R30	1 Meg Ω,3W, 5% Metal Film	011-003-5-105
R32	Trimpot, 2.5KΩ (HORIZONTAL)	010-008-9-005
R33	Trimpot, 500Ω (HORIZONTAL)	010-008-9-003
R41	.01Ω, 10W, 1% 4 Terminal Wirewound	004-177-9-001
R42	684Ω, ½W, ½% P.F. Metal Film	011-058-9-001
R43	12.4KΩ, ¼W, 1% P.F. Metal Film	015-141-1-242
R45	9.09KΩ, ¼W, 1% P.F. Metal Film	015-141-9-091
VR1, 2, 3,	Metal Oxide Varistor	004-179-9-001
	NETWORKS	
RN-1	Resistor Network (INPUT)	012-017-9-001
RN-2	Resistor Network	012-018-9-001
RN-3	Resistor Network	012-014-9-001
	CAPACITORS	
C1	470μF, 25V, Electrolytic	022-095-9-001
C3	220μF, 25V, Electrolytic	022-083-9-001
C4	220μF, 10V, Electrolytic	022-109-9-001
C5	15μF, 20V, 20% P.F. Tantalum	027-016-9-001
C6	47μF, 6.3V, 20% P.F. Tantalum	027-013-9-001
C7	.047μF, 100V, 20% P.F. Polyester	025-094-9-001
C8, 9, 11, 17	0.1μF, 100V, 20% P.F. Polyester	025-109-9-001
C10	.01μF, 100V, 10% P.F. Disc Ceramic	020-101-9-001
C12	0.33μF, 100V, 10% P.F. Polyester	025-114-9-001
C13, 14	10μF, 16V, 20% P.F. Tantalum	027-030-9-001
C15	15μF, 10V, 20% P.F. Tantalum	027-009-9-001
C16	20pF, 500V, 5% P.F. NPO Disc Ceramic	031-039-9-001
C18	.022μF, 1KV, 20% P.F. Polyester	025-103-9-001
C19	100pF, 500V, 10% P.F. Disc Ceramic	020-044-9-001
C20	360pF, 500V, 5% P.F. Disc Ceramic	020-199-9-001
C21	27pF, 500V, 5% P.F. NPO Disc Ceramic	031-046-9-001
	DIODES & TRANSISTORS	
D1, 2, 3, 4, 15, 16	Silicon Diode, 1A, 600V	151-050-9-001
D5	1N4565 (6.4V) Reference Zener	152-066-9-001
D6	1N749A (4.3V) Zener	152-062-9-001
D7	1N4735A (6.2V) Zener	152-037-9-001
D8, 9, 13, 14	1N4148 Silicon Diode	151-038-9-001
D10	Silicon Diode, 1A, 1KV	151-053-9-001
D11,12	Protection Diode (Silicon) 3A	151-054-9-001

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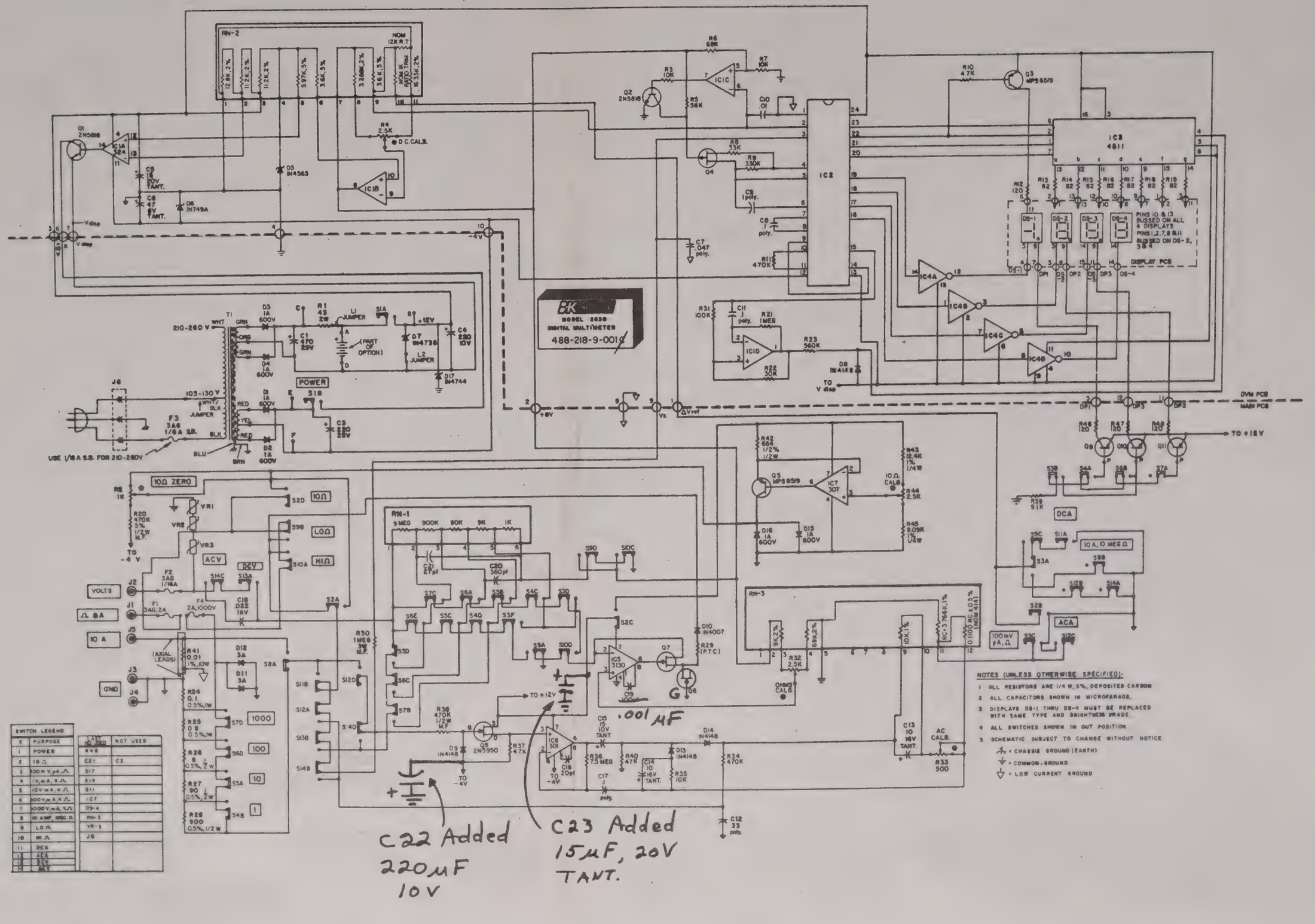
COMPOSITE
499-144-9-001 D


RN-2
NOM 12K R T
R6 68K
R7 10K
R3 10K
R5 56K
Q2 2N5818
IC1C
C10 .01
R10 47K
Q3 MPS6519
IC8
IC3 4011
R4 2.5K
D.C.CAL.
Q1 2N5818
IC1A 324
C5 16 10V TANT.
C6 47 6V TANT.
D5 IN4565
D6 IN749A
IC1B
R8 33K
R9 330K
Q4
C8 .1 poly.
C9 .1 poly.
C7 .047 poly.
R11 470K
R12 120
R13 82
R14 82
R15 82
R16 82
R17 82
R18 82
R19 82
DS-1
DS-2
DS-3
DS-4
PINS 10 & 13 BUSSED ON ALL 4 DISPLAYS
PINS 1,2,7,6 & 11 BUSSED ON DS-2, 3 & 4
DISPLAY PCB
IC4A
IC4B
IC4C
IC4D
R31 100K
C11 .1 poly.
R21 1MEG
IC1D
R23 560K
R22 30K
D8 IN4148
TO V disp
-4V
+8V
Vz
ΔVref
DVM PCB
MAIN PCB
TO +18V
Q9
Q10
Q11
R38 120
R39 91K
DCA
ACA
10 A, 10 MEG Ω
100 mV pA, Ω
R42 624 1/2% 1/2W
R43 12.4K 1% 1/4W
10Ω CAL.
R44 2.5K
R45 9.09K 1% 1/2W
Q5 MPS6519
IC7 307
D16 1A 600V
D13 1A 600V
RN-3
R32 2.5K
OHMS CAL.
RC-3 766K 1%
10K 1%
C13 10 16V TANT.
AC CAL.
R33 500
T1
210-260 V
WHT
GRN
ORG
YEL
GRN
D3 1A 600V
D4 1A 600V
C1 470 25V
R1 43 2W
L1 JUMPER
S1A
S1B
+12V
(PART OF OPTION)
D7 IN4738
L2 JUMPER
D17 IN4744
C4 220 10V
POWER
S1B
J6
105-130 V
WHT
BLK
JUMPER
F3 3AG 1/8A SB.
USE 1/8A S.B. FOR 210-260V
BLK
BLU
BRN
RED
YEL
RED
D1 1A 600V
D2 1A 600V
C3 220 25V
B&K
MODEL 2530
DIGITAL MULTIMETER
488-218-9-001C
RN-1
9 MEG
900K
90K
9K
1K
C21 27pf
C20 360pf
S9D
S9C
S7C
S6A
S3B
S4C
S3D
S6E
S5C
S4D
S3F
S2C
S9A
S9B
S3D
S6C
S7B
S2D
S1B
S1A
S4D
S8B
S1C
R30 1MEG 3W MF.
R36 470K 1/2W MF.
Q8 2N5950
D9 IN4148
R37 47K
TO -4V
TO +12V
IC5 3130
Q7
D10 IN4007
R29 (P.T.C)
G
Q6
.001 MF
IC6 301
C16 20pf
C15 15 10V TANT.
C17 .1 poly.
R36 7.3 MEG
R40 47K
C14 10 16V TANT.
D13 IN4148
R35 10K
D14 IN4148
R34 470K
C12 33 poly.
C22 Added
220μF
10V
C23 Added
15μF, 20V
TANT.
10Ω ZERO
R2 1K
R20 470K 5% 1/2W MF.
VR1
VR2
VR3
TO -4 V
ACV
DCV
S3D
10Ω
S9B
LOΩ
S10A
MIΩ
S3C
S1C
S1A
S2A
FZ 3AG 1/16A
F1 3AG 2A
F4 2A, 1000V
C18 .022 1KV
VOLTS
Ω 8A
10 A
GND
J2
J1
J5
J3
J4
(AXIAL LEADS)
R41 0.01 1%, 10W
D12 3A
D11 3A
S8A
R24 0.1 0.5%, 1W
R25 0.9 0.5%, 1W
R26 9 0.5%, 2W
R27 90 0.5%, 2W
R28 900 0.5%, 1/2W
S7D
1000
S6D
100
S5A
10
S4B
1
S11B
S12A
S12D
S11A
S10B
S12B
S12C
S3A
S8B
S4A
S2B
S1A
S3C
S2C
SWITCH LEGEND
S PURPOSE
1 POWER
2 10 Ω
3 100 mV, pA, Ω
4 1V, mA, Ω
5 10V mA, Ω
6 100V, mA, Ω
7 1000 V, mA, Ω
8 10 AMP, MEG Ω
9 LO Ω
10 MI Ω
11 DCA
12 ACA
13 ACV
R48
C21
D17
S10
Q11
IC7
DS-4
RN-3
VR-3
J6
C2
NOTES (UNLESS OTHERWISE SPECIFIED):
1 ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2 ALL CAPACITORS SHOWN IN MICROFARADS.
3 DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE.
4 ALL SWITCHES SHOWN IN OUT POSITION
5 SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE
= CHASSIS GROUND (EARTH)
= COMMON GROUND
= LOW CURRENT GROUND

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	DIODES & TRANSISTORS (Continued)	
D17	1N4744A (15V) Zener	152-031-9-001
Q1, 2	2N5818 NPN Silicon Transistor	176-051-9-001
Q3, 5	MPS6519 PNP Silicon Transistor	177-015-9-001
Q4, 7	P Channel FET	182-035-9-001
Q6	FET (Clamp Diode)	182-036-9-001
Q8	2N5950 FET	182-031-9-001
Q9, 10, 11	PNP Silicon Transistor	177-017-9-001
	INTEGRATED CIRCUITS	
IC1	324, Quad Op Amp	307-060-9-001
IC2	CMOS LSI A/D Converter	307-085-9-001
IC3	4511	307-061-9-001
IC4	75491	307-082-9-001
IC5	CA-3130S	307-073-9-001
IC6	301	307-074-9-001
IC7	307	307-123-9-001
	MISCELLANEOUS	
T1	Transformer, Power	065-138-9-001
S1 thru 14	Switch Assembly (14 Station)	088-040-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Red Body)	238-009-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Black Body)	238-010-9-001
F1	Fuse, 3AG, 2A	191-251-3-002
F2	Fuse, 3AG, 1/16 A	191-005-9-001
F3	Fuse, 3AG, 1/8 A Slow-Blow (105-130V)	190-251-3-108
	Fuse, 3AG, 1/16 A Slow-Blow (210-260V)	190-002-9-001
F4	Fuse, 1000V, 2A	194-004-9-001
	Overlay, Front Panel	255-161-9-001
	Case, Rear (Plastic)	271-057-9-001
	Case Front (Plastic)	271-062-9-001
	Fuse Lock Housing (½), 2 Required Per Fuse	380-247-9-001
	Handle, Plastic	380-279-9-001
	Window, Display	380-295-9-001
	Pad, Anti-Skid (Rear Foot)	381-080-9-001
	Button, Switch (White)	384-019-9-009
	Button, Switch (Tan)	384-019-9-017
	Button, Switch (Bright Ochre)	384-019-9-020
	AC Power Cord	420-022-9-001
	15-Lead Jumper (Display Board Assembly)	427-025-9-001
	Test Lead, Black	522-062-9-001
	Test Lead, Red	522-063-9-001
	Fuse Holder /Jack Assembly	523-218-9-001
	Decorative Screw (Handle Pivot)	634-085-9-001
	Fuse Clip (3AG)	741-058-9-001
	Fuse Clip (1000V)	741-104-9-001
	Fuse Holder Contact Spring	767-038-9-001
	Spring, Handle Pivot	767-049-9-001
	AC Receptacle	770-018-9-001
	Jack Insert	771-027-9-001

NOTE: Standard value resistors are not listed. Values may be obtained from schematic diagram. Minimum charge $5.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover postage or express charges. Specify serial number when ordering replacement parts.

B & K-PRECISION • DYNASCAN CORPORATION • 6460 W. Cortland St. • Chicago, Ill. 60635

B & K-PRECISION MODEL 2830 DIGITAL MULTIMETER PARTS LIST

488-218-9-002D

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
R2	Potentiometer, 1KΩ, ¼W, 20%	008-333-9-001
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R24	0.1Ω, 1W, ½% P.F. Wirewound	004-178-9-001
R25	0.9Ω, 1W, ½% P.F. Wirewound	004-160-9-001
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R27	90Ω, ½W, ½% P.F. Metal Film	011-089-9-001
R28	900Ω, ½W, ½% P.F. Metal Film	011-141-9-001
R29	Limiter, Special Hi voltage current	004-163-9-001
R30	1 Meg Ω,3W, 5% Metal Film	011-003-5-105
R32	Trimpot, 2.5KΩ (HORIZONTAL)	010-008-9-005
R33	Trimpot, 500Ω (HORIZONTAL)	010-008-9-003
R41	.01Ω, 10W, 1% 4 Terminal Wirewound	004-177-9-001
R42	684Ω, ½W, ½% P.F. Metal Film	011-058-9-001
R43	12.4KΩ, ¼W, 1% P.F. Metal Film	015-141-1-242
R45	9.09KΩ, ¼W, 1% P.F. Metal Film	015-141-9-091
VR1, 2, 3,	Metal Oxide Varistor	004-179-9-001
	NETWORKS	
RN-1	Resistor Network (INPUT)	012-017-9-001
RN-2	Resistor Network	012-018-9-001
RN-3	Resistor Network	012-014-9-001
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C1	470μF, 25V, Electrolytic	022-095-9-001
C3	220μF, 25V, Electrolytic	022-083-9-001
C4	220μF, 10V, Electrolytic	022-109-9-001
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C6	47μF, 6.3V, 20% P.F. Tantalum	027-013-9-001
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C8, 9, 11, 17	0.1μF, 100V, 20% P.F. Polyester	025-109-9-001
C10	.01μF, 100V, 10% P.F. Disc Ceramic	020-101-9-001
C12	0.33μF, 100V, 10% P.F. Polyester	025-114-9-001
C13, 14	10μF, 16V, 20% P.F. Tantalum	027-030-9-001
C15	15μF, 10V, 20% P.F. Tantalum	027-009-9-001
C16	20pF, 500V, 5% P.F. NPO Disc Ceramic	031-039-9-001
C18	.022μF, 1KV, 20% P.F. Polyester	025-103-9-001
C19	100pF, 500V, 10% P.F. Disc Ceramic	020-044-9-001
C20	360pF, 500V, 5% P.F. Disc Ceramic	020-199-9-001
C21	27pF, 500V, 5% P.F. NPO Disc Ceramic	031-046-9-001
	DIODES & TRANSISTORS	
D1, 2, 3, 4, 15, 16	Silicon Diode, 1A, 600V	151-050-9-001
D5	1N4565 (6.4V) Reference Zener	152-066-9-001
D6	1N749A (4.3V) Zener	152-062-9-001
D7	1N4735A (6.2V) Zener	152-037-9-001
D8, 9, 13, 14	1N4148 Silicon Diode	151-038-9-001
D10	Silicon Diode, 1A, 1KV	151-053-9-001
D11,12	Protection Diode (Silicon) 3A	151-054-9-001

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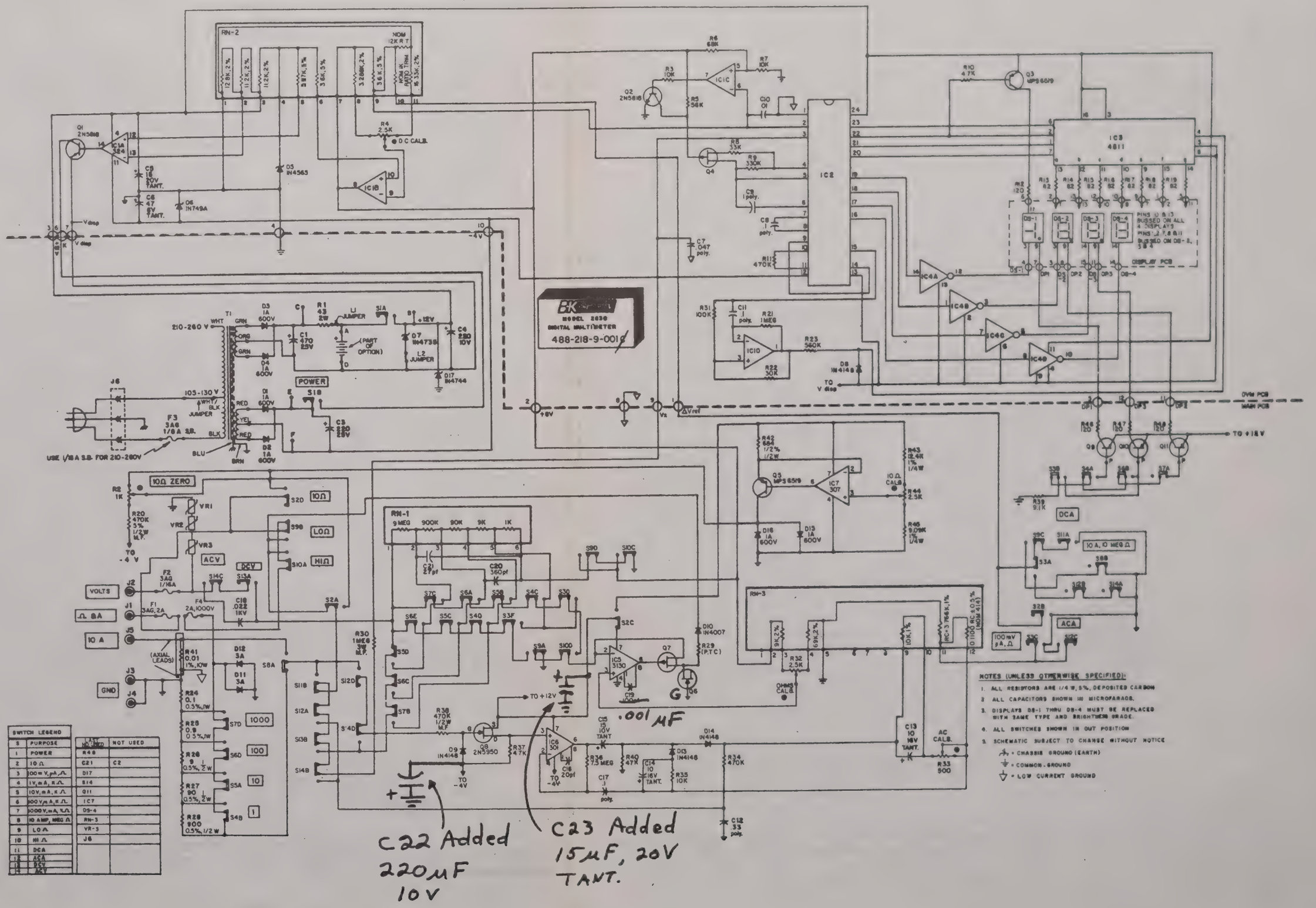
COMPOSITE
499-144-9-001 D


B&K
MODEL 2830
DIGITAL MULTIMETER
488-218-9-001C
POWER
210-260 V
105-130 V
USE 1/8A S.B. FOR 210-260V
10Ω ZERO
VOLTS
Ω 8A
10 A
GND
ACV
DCV
10Ω
LOΩ
HIΩ
1000
100
10
1
DCA
ACA
10 A, 10 MEG Ω
100 mV pA, Ω
OHMS CAL.
10Ω CAL.
AC CAL.
DC CAL.
.001 MF
C22 Added
220μF
10V
C23 Added
15μF, 20V
TANT.
SWITCH LEGEND
S PURPOSE
1 POWER
2 10 Ω
3 100 m V, pA, Ω
4 1V, mA, K Ω
5 10V, mA, K Ω
6 100 V, mA, K Ω
7 1000 V, mA, K Ω
8 10 AMP, MEG Ω
9 LO Ω
10 HI Ω
11 DCA
12 ACA
13 ACV
14 DCV
LAST NUMBER USED
NOT USED
R48
C21 C2
D17
S14
Q11
IC7
DS-4
RN-3
VR-3
J6
NOTES (UNLESS OTHERWISE SPECIFIED):
1. ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2. ALL CAPACITORS SHOWN IN MICROFARADS.
3. DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE.
4. ALL SWITCHES SHOWN IN OUT POSITION
5. SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE
= CHASSIS GROUND (EARTH)
= COMMON GROUND
= LOW CURRENT GROUND

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	DIODES & TRANSISTORS (Continued)	
D17	1N4744A (15V) Zener	152-031-9-001
Q1, 2	2N5818 NPN Silicon Transistor	176-051-9-001
Q3, 5	MPS6519 PNP Silicon Transistor	177-015-9-001
Q4, 7	P Channel FET	182-035-9-001
Q6	FET (Clamp Diode)	182-036-9-001
Q8	2N5950 FET	182-031-9-001
Q9, 10, 11	PNP Silicon Transistor	177-017-9-001
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IC3	4511	307-061-9-001
IC4	75491	307-082-9-001
IC5	CA-3130S	307-073-9-001
IC6	301	307-074-9-001
IC7	307	307-123-9-001
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T1	Transformer, Power	065-138-9-001
S1 thru 14	Switch Assembly (14 Station)	088-040-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Red Body)	238-009-9-001
DS1, 2, 3, 4	Display, 7-Segment LED (Black Body)	238-010-9-001
F1	Fuse, 3AG, 2A	191-251-3-002
F2	Fuse, 3AG, 1/16 A	191-005-9-001
F3	Fuse, 3AG, 1/8 A Slow-Blow (105-130V)	190-251-3-108
	Fuse, 3AG, 1/16 A Slow-Blow (210-260V)	190-002-9-001
F4	Fuse, 1000V, 2A	194-004-9-001
	Overlay, Front Panel	255-161-9-001
	Case, Rear (Plastic)	271-057-9-001
	Case Front (Plastic)	271-062-9-001
	Fuse Lock Housing (½), 2 Required Per Fuse	380-247-9-001
	Handle, Plastic	380-279-9-001
	Window, Display	380-295-9-001
	Pad, Anti-Skid (Rear Foot)	381-080-9-001
	Button, Switch (White)	384-019-9-009
	Button, Switch (Tan)	384-019-9-017
	Button, Switch (Bright Ochre)	384-019-9-020
	AC Power Cord	420-022-9-001
	15-Lead Jumper (Display Board Assembly)	427-025-9-001
	Test Lead, Black	522-062-9-001
	Test Lead, Red	522-063-9-001
	Fuse Holder /Jack Assembly	523-218-9-001
	Decorative Screw (Handle Pivot)	634-085-9-001
	Fuse Clip (3AG)	741-058-9-001
	Fuse Clip (1000V)	741-104-9-001
	Fuse Holder Contact Spring	767-038-9-001
	Spring, Handle Pivot	767-049-9-001
	AC Receptacle	770-018-9-001
	Jack Insert	771-027-9-001

NOTE: Standard value resistors are not listed. Values may be obtained from schematic diagram. Minimum charge $5.00 per invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover postage or express charges. Specify serial number when ordering replacement parts.

B & K-PRECISION MODEL 2830 DIGITAL MULTIMETER PARTS LIST

488-218-9-002D

SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
	RESISTORS	
R2	Potentiometer, 1KΩ, ¼W, 20%	008-333-9-001
R4, 44	Trimpot, 2.5KΩ (VERTICAL)	010-007-9-005
R20, 38	470KΩ, ½W, 5% P.F. Metal Film	011-102-8-474
R24	0.1Ω, 1W, ½% P.F. Wirewound	004-178-9-001
R25	0.9Ω, 1W, ½% P.F. Wirewound	004-160-9-001
R26	9Ω, ½W, ½% P.F. Metal Film	011-088-9-001
R27	90Ω, ½W, ½% P.F. Metal Film	011-089-9-001
R28	900Ω, ½W, ½% P.F. Metal Film	011-141-9-001
R29	Limiter, Special Hi voltage current	004-163-9-001
R30	1 Meg Ω,3W, 5% Metal Film	011-003-5-105
R32	Trimpot, 2.5KΩ (HORIZONTAL)	010-008-9-005
R33	Trimpot, 500Ω (HORIZONTAL)	010-008-9-003
R41	.01Ω, 10W, 1% 4 Terminal Wirewound	004-177-9-001
R42	684Ω, ½W, ½% P.F. Metal Film	011-058-9-001
R43	12.4KΩ, ¼W, 1% P.F. Metal Film	015-141-1-242
R45	9.09KΩ, ¼W, 1% P.F. Metal Film	015-141-9-091
VR1, 2, 3,	Metal Oxide Varistor	004-179-9-001
	NETWORKS	
RN-1	Resistor Network (INPUT)	012-017-9-001
RN-2	Resistor Network	012-018-9-001
RN-3	Resistor Network	012-014-9-001
	CAPACITORS	
C1	470μF, 25V, Electrolytic	022-095-9-001
C3	220μF, 25V, Electrolytic	022-083-9-001
C4	220μF, 10V, Electrolytic	022-109-9-001
C5	15μF, 20V, 20% P.F. Tantalum	027-016-9-001
C6	47μF, 6.3V, 20% P.F. Tantalum	027-013-9-001
C7	.047μF, 100V, 20% P.F. Polyester	025-094-9-001
C8, 9, 11, 17	0.1μF, 100V, 20% P.F. Polyester	025-109-9-001
C10	.01μF, 100V, 10% P.F. Disc Ceramic	020-101-9-001
C12	0.33μF, 100V, 10% P.F. Polyester	025-114-9-001
C13, 14	10μF, 16V, 20% P.F. Tantalum	027-030-9-001
C15	15μF, 10V, 20% P.F. Tantalum	027-009-9-001
C16	20pF, 500V, 5% P.F. NPO Disc Ceramic	031-039-9-001
C18	.022μF, 1KV, 20% P.F. Polyester	025-103-9-001
C19	100pF, 500V, 10% P.F. Disc Ceramic	020-044-9-001
C20	360pF, 500V, 5% P.F. Disc Ceramic	020-199-9-001
C21	27pF, 500V, 5% P.F. NPO Disc Ceramic	031-046-9-001
	DIODES & TRANSISTORS	
D1, 2, 3, 4, 15, 16	Silicon Diode, 1A, 600V	151-050-9-001
D5	1N4565 (6.4V) Reference Zener	152-066-9-001
D6	1N749A (4.3V) Zener	152-062-9-001
D7	1N4735A (6.2V) Zener	152-037-9-001
D8, 9, 13, 14	1N4148 Silicon Diode	151-038-9-001
D10	Silicon Diode, 1A, 1KV	151-053-9-001
D11,12	Protection Diode (Silicon) 3A	151-054-9-001

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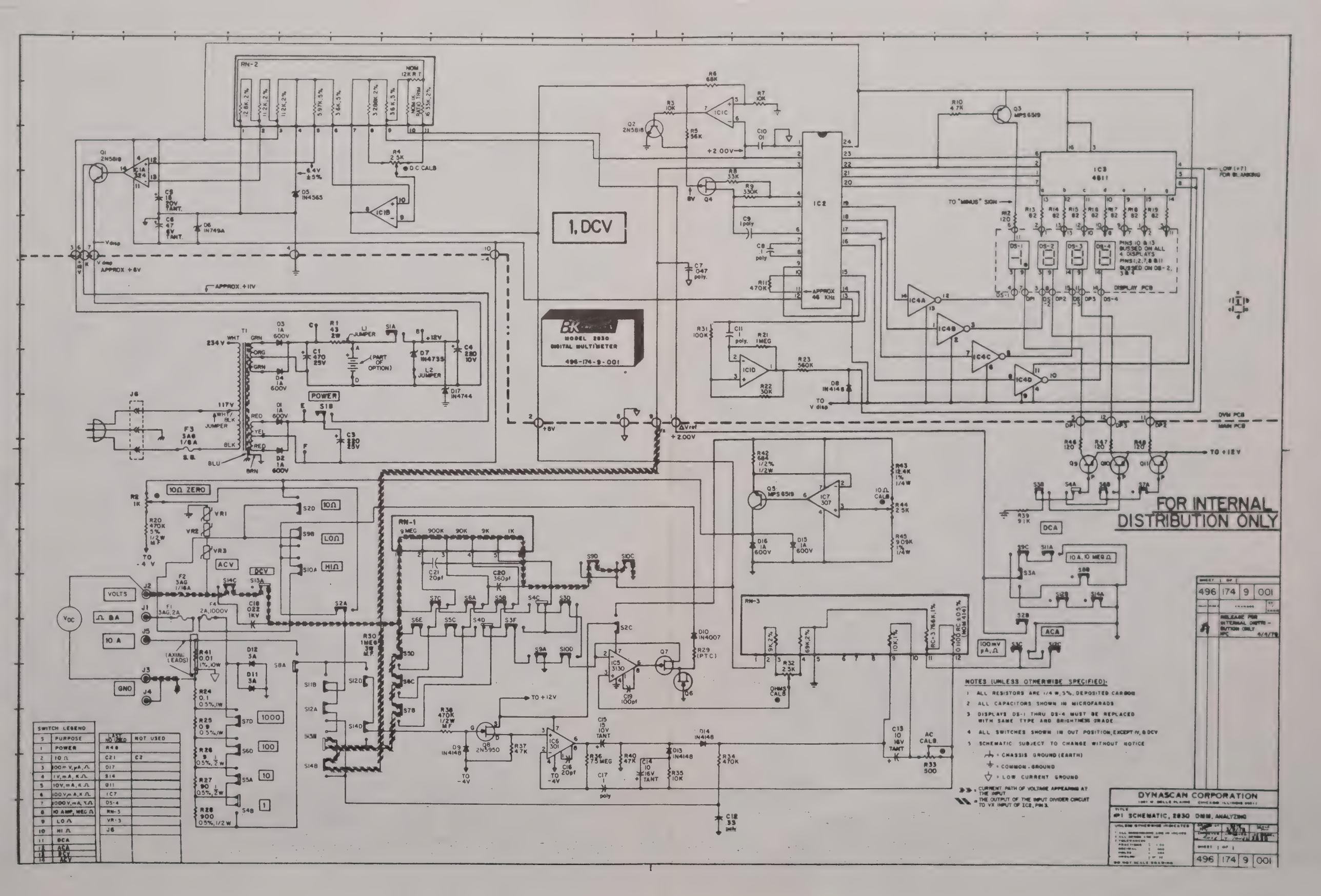
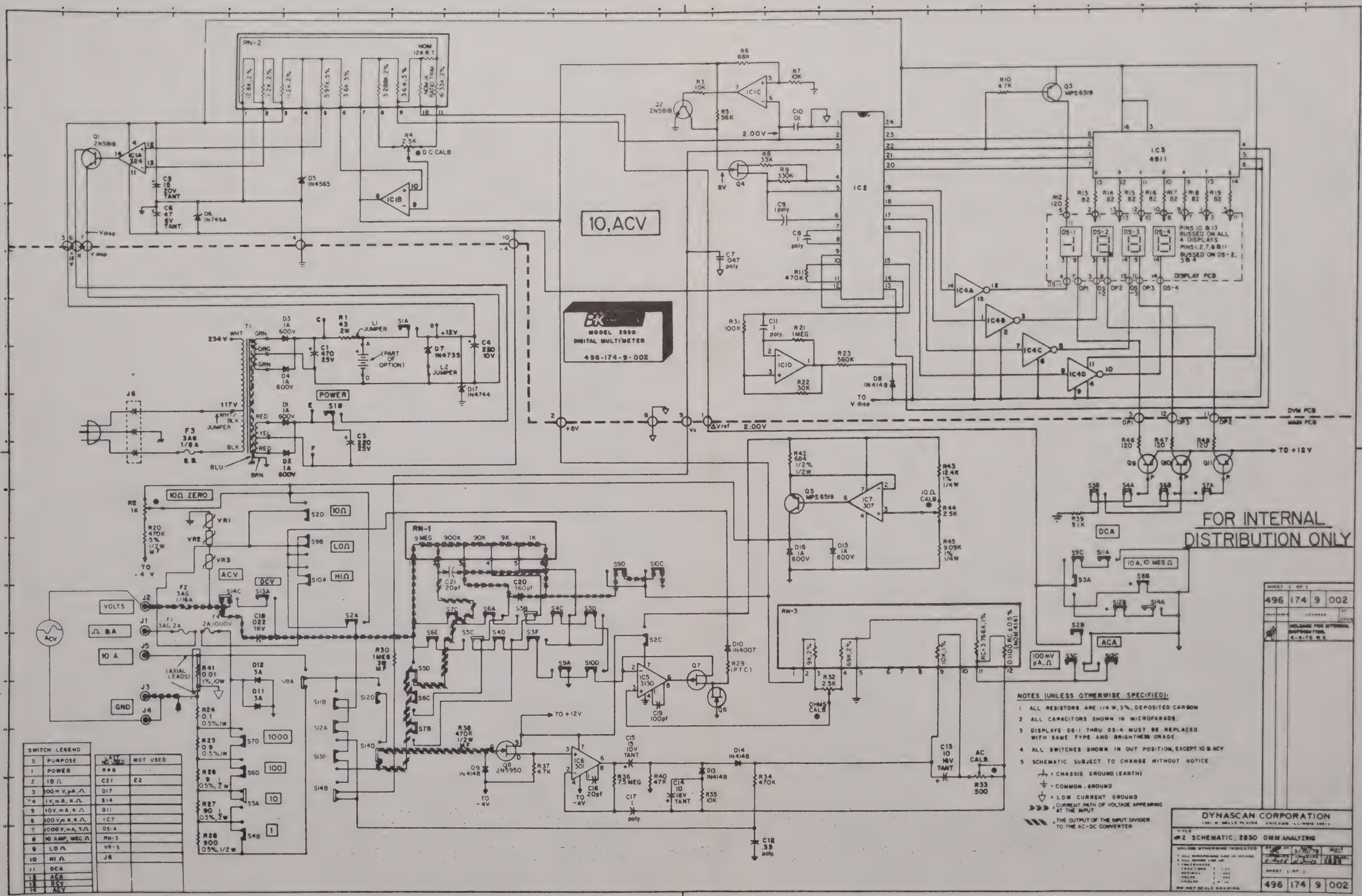
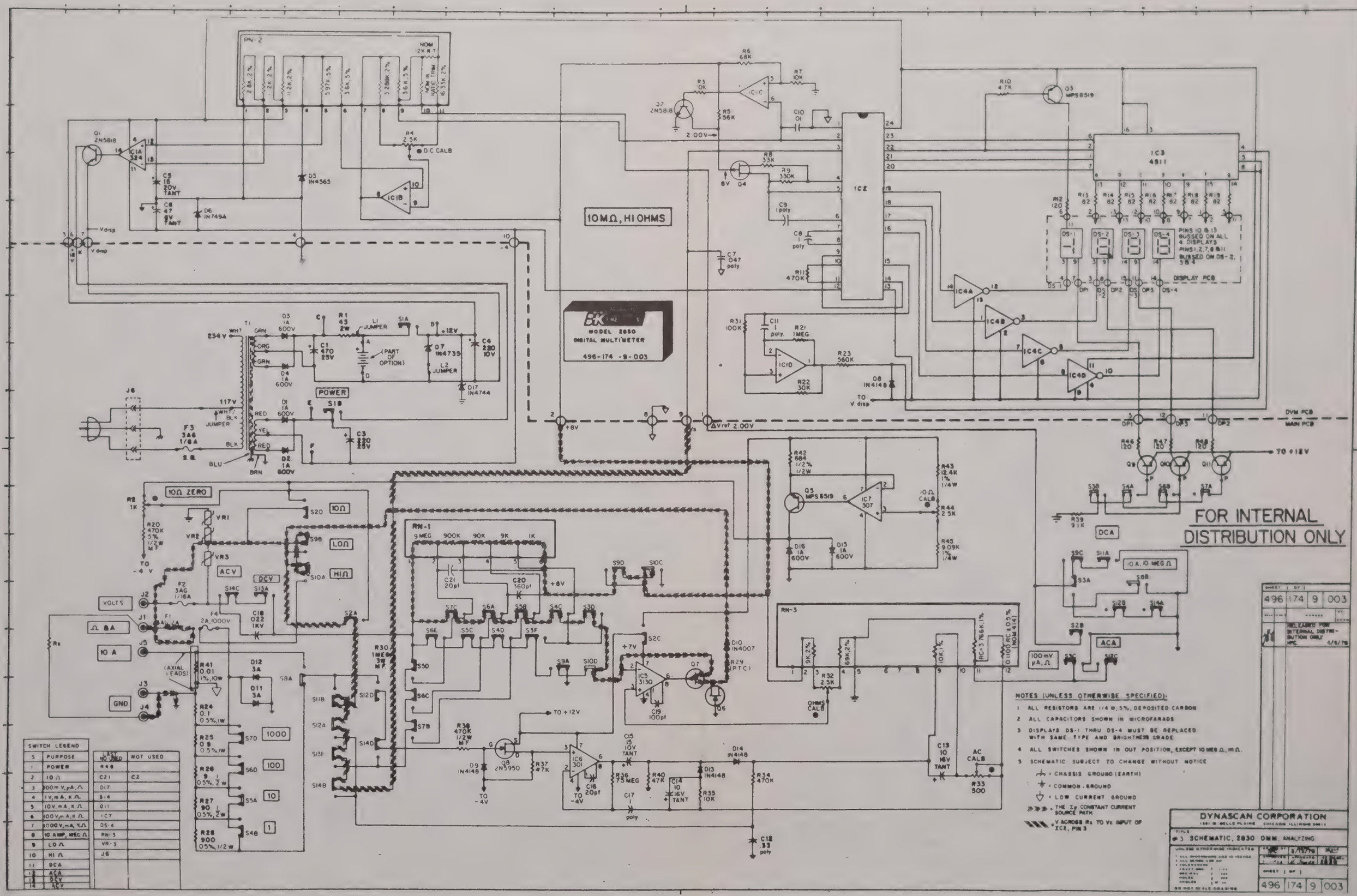
COMPOSITE
499-144-9-001 D


1, DCV
MODEL 2830
DIGITAL MULTIMETER
496-174-9-001
FOR INTERNAL DISTRIBUTION ONLY
DYNASCAN CORPORATION
SCHEMATIC, 2830 DMM, ANALYZING
496 174 9 001
NOTES (UNLESS OTHERWISE SPECIFIED):
1 ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2 ALL CAPACITORS SHOWN IN MICROFARADS
3 DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4 ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT IV, & DCV
5 SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE
= CHASSIS GROUND (EARTH)
= COMMON - GROUND
= LOW CURRENT GROUND
= CURRENT PATH OF VOLTAGE APPEARING AT THE INPUT
= THE OUTPUT OF THE INPUT DIVIDER CIRCUIT TO VX INPUT OF IC8, PIN 3.
SWITCH LEGEND
S PURPOSE
1 POWER
2 10 Ω
3 300 m V, μA, Ω
4 1V, mA, K Ω
5 10V, mA, K Ω
6 100 V, m A, K Ω
7 1000 V, mA, Ω
8 10 AMP, MEG Ω
9 LO Ω
10 HI Ω
11 DCA
12 ACA
13 ACV
14 DCV
PARTS NOT USED
PART NO. USED
NOT USED
R48
C21
C2
D17
S14
D11
IC7
DS-4
RN-3
VR-3
J6


10,ACV
B&K
MODEL 2030
DIGITAL MULTIMETER
498-174-9-002
FOR INTERNAL DISTRIBUTION ONLY
DYNASCAN CORPORATION
#2 SCHEMATIC, 2830 DMM ANALYZING
496 174 9 002
NOTES (UNLESS OTHERWISE SPECIFIED):
1 ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2 ALL CAPACITORS SHOWN IN MICROFARADS.
3 DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4 ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT 10 & ACV
5 SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE
SWITCH LEGEND
1 POWER
2 10 Ω
3 100 mV, μA, Ω
4 1V, mA, K Ω
5 10V, mA, K Ω
6 100V, mA, K Ω
7 1000V, mA, K Ω
8 10 AMP, MEG Ω
9 LO Ω
10 HI Ω
11 DCA
12 ACA
13 DCV
14 ACV
NOT USED
R46
C21 C2
D17
S14
Q11
IC7
DS-4
RN-3
VR-3
J6



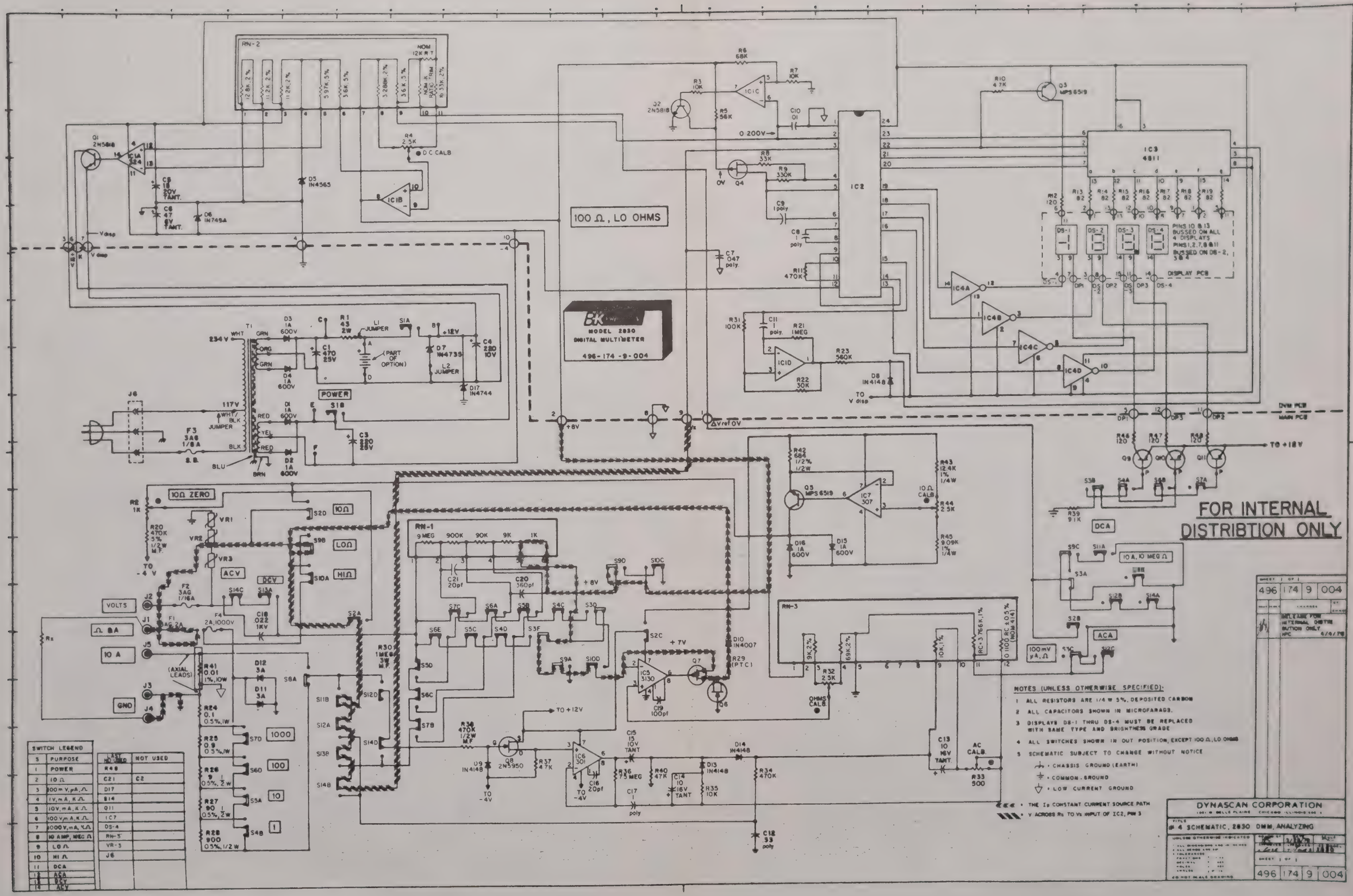
SWITCH LEGEND	
S	PURPOSE
1	POWER
2	10 Ω
3	100mV, μA, Ω
4	1V, mA, K Ω
5	10V, mA, K Ω
6	100V, mA, K Ω
7	1000V, mA, K Ω
8	10 AMP, MEG Ω
9	LO Ω
10	HI Ω
11	DCA
12	ACA
13	DCV
14	ACV

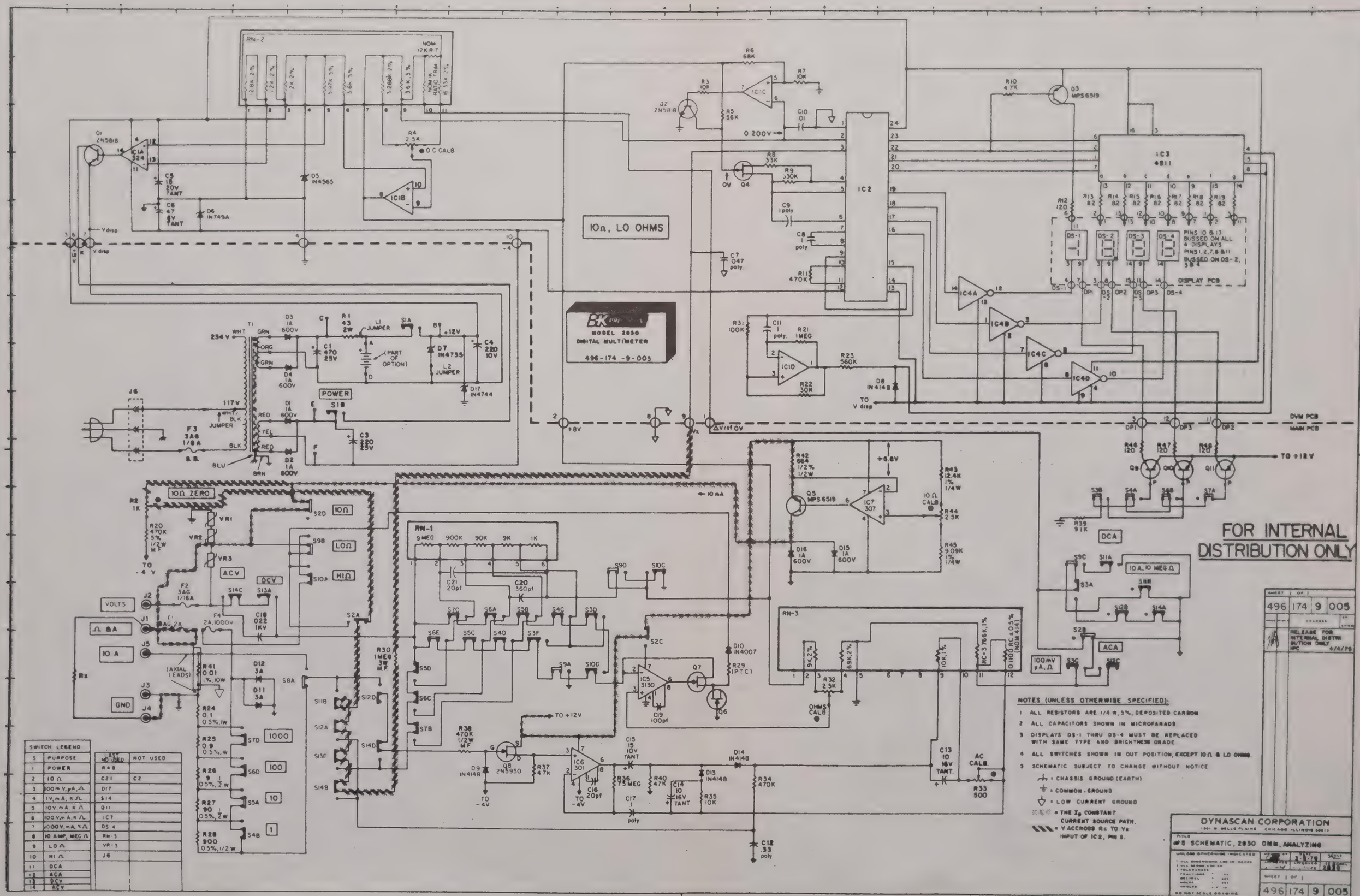
ASY NO USED	NOT USED
R48	
C21	C2
D17	
S14	
Q11	
IC7	
DS-4	
RN-3	
VR-3	
J6	

NOTES (UNLESS OTHERWISE SPECIFIED):

1. ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2. ALL CAPACITORS SHOWN IN MICROFARADS
3. DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4. ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT 10 MEG Ω, 10 Ω.
5. SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE

⏚ = CHASSIS GROUND (EARTH)
⏚ = COMMON GROUND
▽ = LOW CURRENT GROUND
»» = THE Zp CONSTANT CURRENT SOURCE PATH
\\\\ = V ACROSS Rx TO Vx INPUT OF IC2, PIN 3


100 Ω, LO OHMS
B&K
MODEL 2830
DIGITAL MULTIMETER
496-174-9-004
POWER
10Ω ZERO
VOLTS
Ω 8A
10 A
GND
ACV
DCV
LOΩ
HIΩ
10Ω
1000
100
10
1
DC CALB
OHMS CALB.
AC CALB.
10Ω CALB.
+8V
+7V
+12V
-4V
0V
0 200V→
TO +12V
TO -4V
TO V disp
TO +18V
DVM PCB
MAIN PCB
DISPLAY PCB
DCA
ACA
10 A, 10 MEG Ω
100mV μA, Ω
FOR INTERNAL DISTRIBTION ONLY
DYNASCAN CORPORATION
4 SCHEMATIC, 2830 DMM, ANALYZING
496 174 9 004
SWITCH LEGEND
S PURPOSE
1 POWER
2 10 Ω
3 300 m V, μA, Ω
4 1V, mA, K Ω
5 10V, mA, K Ω
6 100 V, mA, K Ω
7 1000 V, mA, Ω
8 10 AMP, MEG Ω
9 LO Ω
10 HI Ω
11 DCA
12 ACA
13 DCV
14 ACV
ASS'D NOT USED
R48
C21 C2
D17
B14
Q11
IC7
DS-4
RN-5
VR-3
J6
NOTES (UNLESS OTHERWISE SPECIFIED):
1 ALL RESISTORS ARE 1/4 W 5%, DEPOSITED CARBON
2 ALL CAPACITORS SHOWN IN MICROFARADS.
3 DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4 ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT 100 Ω, LO OHMS
5 SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE
⏚ = CHASSIS GROUND (EARTH)
⏚ = COMMON GROUND
▽ = LOW CURRENT GROUND
THE Io CONSTANT CURRENT SOURCE PATH
V ACROSS R1 TO V1 INPUT OF IC2, PIN 3



SWITCH LEGEND		ALL NO USED	NOT USED
S	PURPOSE	R40	
1	POWER	C21	C2
2	10 Ω	D17	
3	100m V, μA, Ω	S14	
4	1V, mA, K Ω	Q11	
5	10V, mA, K Ω	IC7	
6	100V, mA, K Ω	DS 4	
7	1000V, mA, K Ω	RN-3	
8	10 AMP, MEG Ω	VR-3	
9	LO Ω	J6	
10	HI Ω		
11	DCA		
12	ACA		
13	DCV		
14	ACV		

NOTES (UNLESS OTHERWISE SPECIFIED):

1. ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2. ALL CAPACITORS SHOWN IN MICROFARADS.
3. DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4. ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT 10Ω & LO OHMS.
5. SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE

⏚ = CHASSIS GROUND (EARTH)
⏚ = COMMON-GROUND
⏚ = LOW CURRENT GROUND
= THE I_0 CONSTANT CURRENT SOURCE PATH.
= V ACCROSS Rx TO Vx INPUT OF IC2, PIN 8.

FOR INTERNAL DISTRIBUTION ONLY

SHEET 1 OF 1			
496	174	9	005

RELEASE FOR INTERNAL DISTRIBUTION ONLY 4/6/78

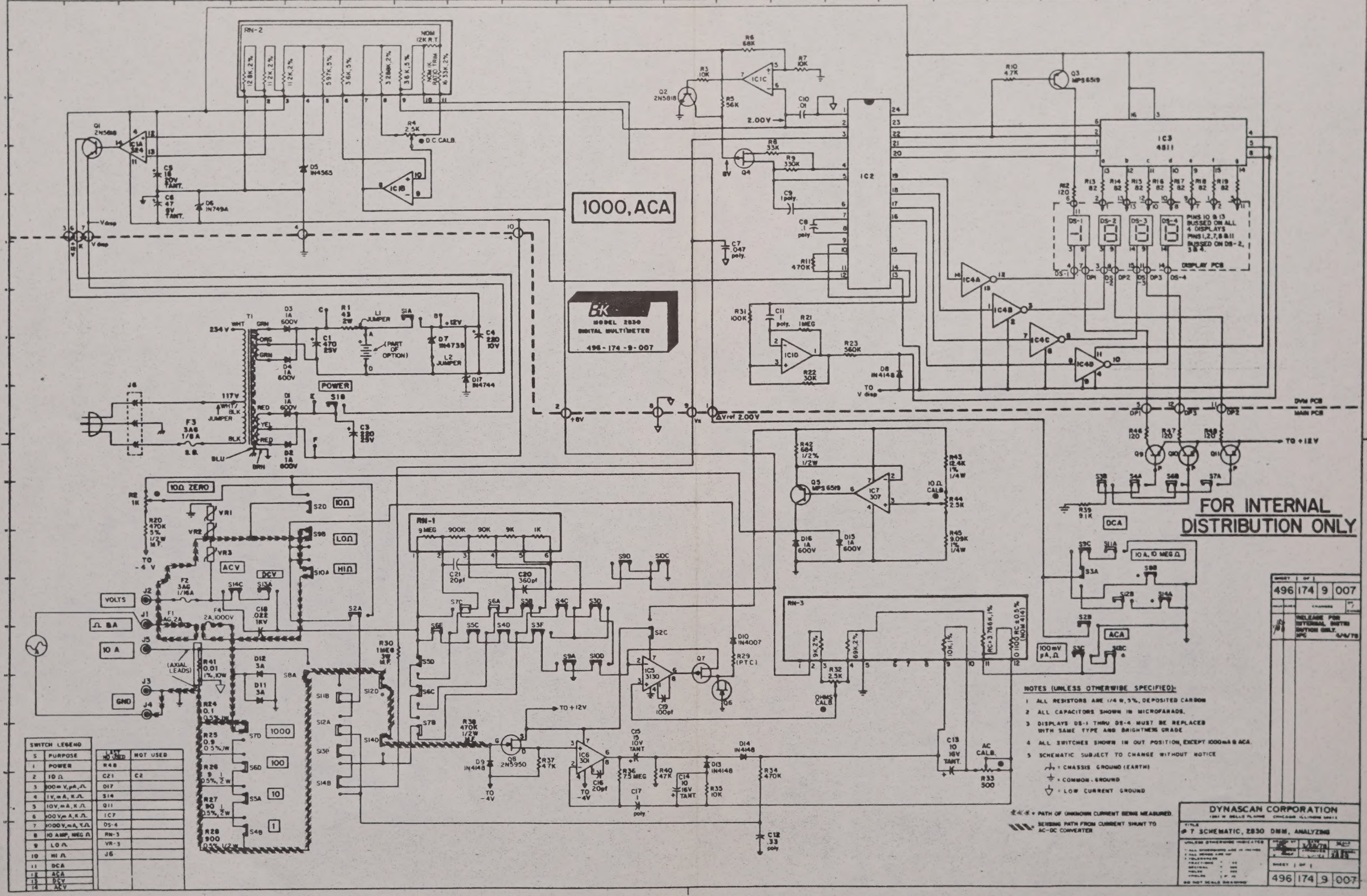
DYNASCAN CORPORATION
1801 W. BELLE PLAINE CHICAGO ILLINOIS 60613

TITLE: #8 SCHEMATIC, 2830 DMM, ANALYZING

UNLESS OTHERWISE INDICATED
DO NOT SCALE DRAWING

SHEET 1 OF 1

496	174	9	005



SWITCH LEGEND	
S	PURPOSE
1	POWER
2	10 Ω
3	300 m V, pA, Ω
4	1V, mA, K Ω
5	10V, mA, K Ω
6	100 V, mA, K Ω
7	1000V, mA, T Ω
8	10 AMP, MEG Ω
9	LO Ω
10	HI Ω
11	DCA
12	ACA
13	DCV
14	ACV

LAST NO. USED	NOT USED
R48	
C21	C2
D17	
S14	
Q11	
IC7	
DS-4	
RN-3	
VR-3	
J6	

NOTES (UNLESS OTHERWISE SPECIFIED):

1. ALL RESISTORS ARE 1/4 W, 5%, DEPOSITED CARBON
2. ALL CAPACITORS SHOWN IN MICROFARADS.
3. DISPLAYS DS-1 THRU DS-4 MUST BE REPLACED WITH SAME TYPE AND BRIGHTNESS GRADE
4. ALL SWITCHES SHOWN IN OUT POSITION, EXCEPT 1000 mA & ACA.
5. SCHEMATIC SUBJECT TO CHANGE WITHOUT NOTICE

⏚ = CHASSIS GROUND (EARTH)
⏚ = COMMON - GROUND
▽ = LOW CURRENT GROUND

*** = PATH OF UNKNOWN CURRENT BEING MEASURED.
SENSING PATH FROM CURRENT SHUNT TO AC-DC CONVERTER

SHEET 1 OF 1			
496	174	9	007

RELEASE FOR INTERNAL DISTRIBUTION ONLY 6/4/75 JAS

DYNASCAN CORPORATION
1801 W. BELLE PLAINE CHICAGO, ILLINOIS 60613

TITLE
7 SCHEMATIC, 2830 DMM, ANALYZING

UNLESS OTHERWISE INDICATED
1. ALL DIMENSIONS ARE IN INCHES
2. ALL BENDS ARE 90°
3. TOLERANCES
FRACTIONS ± .03
DECIMAL .X ± .1
.XX ± .05
.XXX ± .01
ANGLES ± 1°
DO NOT SCALE DRAWING

DRAWN BY	TITLE	SCALE
SHEET 1 OF 1		
496	174	9	007

HISTORY OF PRODUCTION CHANGES
Model 2830 Digital Multimeter

Original Version:

As shown on functional schematic diagrams of this service manual.

First Production Change:

C21 was changed from 20 pF ±5%, 500 V NPO Disc Ceramic Capacitor (031-039-9-001) to 25 pF, ±10%, 500 V NPO Disc Ceramic Capacitor (031-029-9-001).

Second Production Change:

C21 was change from 25 pF ±10%, 500 V NPO Disc Ceramic Capacitor (031-029-9-001) to 27 pF ±5%, 500 V NPO Disc Ceramic Capacitor (031-046-9-001).

Third Production Change:

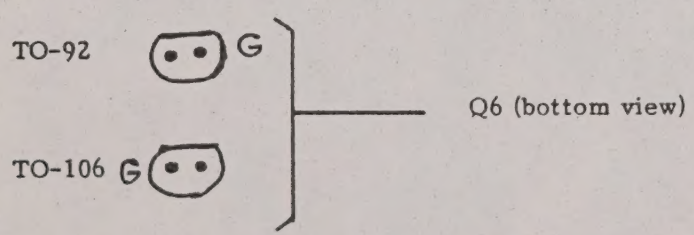
C19 was changed from 100 pF ±5%, 500 V Disc Ceramic Capacitor (020-044-9-001) to .001 µF ±10%, 500 V Disc Ceramic Capacitor (020-016-9-001).

C22 was added, 220 µF, 10 V Electrolytic Capacitor (022-109-9-001). See accompanying schematic diagram for location.

C23 was added, 15 µF ±20%, 20 V Tantalum Capacitor (027-016-9-001). See accompanying schematic diagram for location.

SERVICE NOTES

For reference when servicing the 2830, use the following basing diagram for Q6:



INSTRUCTION MANUAL ADDENDUM

for

MODEL 2830

3½-DIGIT

DIGITAL MULTIMETER

In the 100Ω range, it is normal to observe a non-zero reading (a few tenths of an ohms) when the test leads are shorted together. That reading is due to the resistance of the front panel fuse, jacks, and test leads. Subtract the value from any readings on this range, if critical.

B+K PRECISION DYNASCAN CORPORATION

494-075-9-001B